THE IRON TRADE REVIEW

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SLOW PROGRESS

IN RECOVERING FROM LAST YEAR'S DEPRESSION.

Low Prices for Pig Iron in Central West.—Large Rail Tonnage May be Placed Soon.—Tin Plate and Wire Active.

The first quarter of the year has shown slow progress in recovering from the deep depression of December. Progress during the past month has been confined almost entirely to finished products for which there is increased demand during the spring. If the increased activity in these lines should not continue during the present month, a considerable increase in the production of other materials will be necessary in order to maintain the present percentage of active capacity of all iron and steel manufacturing concerns.

Pig Iron Depressed

While some signs of improvement in the pig iron market are noted in the east, the central west has developed little business and considerable cutting of prices. The Cleveland agreement on delivery prices in central western territory is now observed by so few producers that little is heard of it, and orders are freely taken at $15.50, valley, for No. 2, while other furnaces are quoting as low as $15.25, and in one case, an Ohio interest sold a fair tonnage for delivery in eastern Pennsylvania at $14 75, furnace. The latter price could not be made for delivery at Ohio points, but it indicates what some sellers will do in order to obtain business outside of their usual field of activity. The principal sales reported were of malleable, at Philadelphia, aggregating about 2,000 tons. An inquiry from St. Louis for 5,000 tons of basic, which had been pending about a month, resulted in an order for 1,000 tons being taken. We note the sale of 200 tons of ferro-manganese at $42, the lowest price in three years.

Structural Material

During the past month, the principal erector of structural material has booked a very small volume of orders, and a large percentage of the limited business taken has gone to independent concerns. Some surprisingly low bids on erecting and fabricating have been made, and it is evident that either the material has been obtained at less than regular prices, or that the work has been done at or below cost. The contract for erecting the Milwaukee viaduct, involving 2,550 tons; was taken by the Milwaukee Bridge Co. The contract for building the walls of the lock for the ship canal near Buffalo has been awarded to MacArthur Bros. Co, of New York City, which has not yet contracted for the 7,000 tons of steel piling required.

Railroad Buying

Railroads are showing more disposition than for some time to make repairs, and some orders, including 500 cars by the Lehigh & New England railroad, 2,500 tons of axles and 7,000 kegs of bolts by the St. Paul railroad, are reported, but there is still much uncertainty as to the ability of railroads to meet obligations and arrange for new expenditures. It is clear, however, that the present supply of equipment fit for service is inadequate and that at a not far distant date considerable expenditures will be absolutely necessary. Negotiations for large rail tonnages are nearing completion. The street railways are placing orders for a considerable amount of new equipment, but traction companies are having difficulty in making financial arrangements to permit them to buy rails. Contracts are to be awarded sometime late in May for the construction of the Fourth Avenue subway in Brooklyn at an estimated cost of $15,000,000. A four-track subway will be built, but the current call for bids does not include rails or equipment. Although the steel requirements will aggregate a heavy tonnage, the contract will be let in six sections and two years will be allowed to complete the work. Our correspondent at Dusseldorf confirms the report that the Stahlwerks-Verband has taken an order for 25,000 tons of rails for the Buenos Ayres & Rosario railway in competition with American interests. It is also reported that a British firm has taken a contract for 20,000 tons for the same railroad at a price not announced.

Tin Plate and Wire

Orders for tin plate and wire goods are coming in satisfactory volume, and the business in sheets, especially in blue annealed, is good. There is also a fair demand for tubular goods. The demand for plates is light.

Coke and Old Material

The coke market continues dull, with production very low and prices uncertain. The strike of coal miners, if long continued, may have an important effect on the coke situation. Scrap is much depressed, with a tendency toward lower quotations.

Iron Ore Prices

The scenes of activity usually noticeable along the lakes about April 1 are almost entirely lacking. Although some passenger boats are now running, it is not expected that any considerable number of freight vessels will be placed in commission before June 1. Ore docks are so fully occupied that ore could not be placed there, and furnace yards are, in many cases, almost as fully occupied. Some furnace interests have begun agitating in favor of lower prices on ore, but sellers are firm in adhering to quotations, and there is no prospect that concessions will be made.

THE WEEK IN IRON CENTERS

PITTSBURG.

Recovery Is Proceeding Slowly—Low Pig Iron Prices.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., March 31.

The close of March marks the three months' stage in the process of recovery through which the iron and steel industry has been passing. With the beginning of April and the virtual inauguration of the season of the year when commercial affairs are normally given a fresh vigor and impetus, the iron and steel trade, as a whole, is found to be operating upon less than a 50 per cent basis, or a gain of approximately 20 per cent over December when the mark of least activity was touched.

Viewed as a month, March has brought some encouraging gains to different lines of output and has strengthened the entire situation, accordingly. It has not, however, been fully up to general expectations. The month started well for all lines and the first several weeks were quite satisfactory, but this gain was not maintained to the end. A striking of averages leaves a small but definite percentage of gain over February.

An analysis of the month's developments, shows the most marked increase in those finished lines which are subject to the influence of the season. Tin plate stands out prominently in this regard with a gain of about 10 per cent, and wire products made an even better record. Sheets advanced about 7 per cent, as gaged by mill operations, while in merchant pipe the estimates of gains made by the leading mills range from 10 to 15 per cent.

In other products, merchant bars netted a small increase over February, but the rail situation was changed but little in the month in respect to tonnage actually placed. Plates and structural material were almost stationary.

Of the complete market structure, pig iron is proving to be the weakest member, and is less settled as to prices at this time than a month previous. The dullness of the demand for iron and the impatience of some interests to convert their make into sales, has augmented the market's instability.

Sentimentally, the situation is good, and with the elimination of those factors, the final settlement of which is casting uncertainty upon the future, a substantial volume of trade is confidently expect to appear. This may not come before midsummer or even later, but the passing of each month brings that occasion nearer to realization and the consensus of business judgment is to the effect that the final quarter of the year will be the one to most closely approach the prosperous conditions of the past.

Temporarily at least, a new factor has appeared to give concern to manufacturers and this is the probability of curtailed operations in the mining regions, through suspension of work by the men. A sharp increase of coal shipments on old contracts, during the past several weeks, has reflected the purpose of consumers to be safely fortified in this particular. Coke operators are especially interested in the outcome of the present controversy between mine owners and miners because it may provide an opportunity to them to dispose of their mine product, direct, at a better advantage than offering it in the form of coke at the prevailing low prices.

Pig Iron.—The opening of the second quarter finds pig iron in a weak position which, because of the dullness of the trade in this district, leaves the future of the market an unsettled proposition. Prices have declined, in that $15.50 valley furnace or $16.40, delivered Pittsburg, has become the prevailing figure at which No. 2 iron is moving, although some selling interests continue to observe the Cleveland schedule price of $17, delivered, in their quotations. Some furnaces are willing to shade the $15.50 valley furnace price, and are quoting as low as $15.25 valley. We note the sale of 100 tons of standard No. 2 foundry at $15.35 valley or $16.25 delivered Pittsburg; also 100 tons of the same grade at $15.50 valley or $16.40 delivered Pittsburg. Another valley furnace made an offer of $15.25 furnace for the first lot, but it had already been closed. Of six quotations submitted on this tonnage, but one adhered to the Cleveland schedule. Some other scattering sales have been closed at $15.50 to $15.75 furnace, but the inquiry is very light. The 4,500-ton western New York inquiry noted last week, has not been closed.

In malleable, there is a little inquiry from Pittsburg and northern Ohio districts, and the price is held at about $16 valley. Bessemer iron is quiet, but we note the sale of over 500 tons of chilled cast iron of special sulphur analysis, at $18.25 valley furnace. Sand cast Bessemer is about $16.75 valley. In basic, we note the sale of 800 tons coming to this district, in which the price was not significant because exchange considerations were involved. The basic market ranges from $15.50 to $15.75 valley. Bessemer and basic stocks in the valleys now amount to about 63,000 tons, having declined 12,000 tons over current production in the month of March. Canal Dover stack of the Penn Coal & Iron Co. which, for statistical purposes, is regarded as a valley furnace, has gone in on basic, making 6 of 19 furnaces in the valleys in operation, Shenango No. 3 on Bessemer and basic, Stewart on low phosphorus, Tod on Bessemer and one Andrews & Hitchcock and Girard on foundry and gray forge.

In southern iron, of the inquiry of 700 tons to western New York reported last week, 600 tons for delivery over the next several months were bought on analysis corresponding to No. 2 iron at $12 Birmingham. A lot of 100 tons of No. 3 southern was sold at $11.50 Birmingham or $16.40 delivered in this district. We also note the sale of 2,000 tons of southern gray forge for prompt shipment to western New York at $10.50 Birmingham or $15.40 delivered.

The Sloss-Sheffield Steel & Iron Co. has announced that it has no low grade iron to offer before June 1. For prompt or second quarter delivery, we quote as follows.

Bessemer, valley	$16.75 to 18.00
Bessemer, Pittsburg	17.65 to 18.90
No. 1 foundry, Pittsburg	17.00 to 17.50
No. 2 foundry, Pittsburg	16.25 to 17.00
Gray forge, Pittsburg	15.90 to 16.15
Basic, valley	15 75 to 16.50
Basic, Pittsburg	16.65 to 17.40

Ferro-Manganese.—Carload sales of ferro-manganese place the market for prompt shipment at about $45 Pittsburg, but as the tendency is downward, this price could probably be further shaded. Ferro-silicon is also weak. We quote 80 per cent ferro-manganese, for prompt shipment from European ports, at $45 to $45.50 Pittsburg.

Imported 50 per cent ferro-silicon is quoted $78 Pittsburg on forward deliveries; domestic 12 per cent, $29; 11 per cent, $28; 10 per cent, $27. The lower grades of imported ferro-silicon are quoted 50 cents lower. These quotations are applicable to Pittsburg territory.

Plates.—The month of March has brought little improvement to the plate market. Conditions continue un-

satisfactory to manufacturers, and, if anything, less firmness is shown. Mill operations are intermittent, and in total percentage have not increased. Conditions among the principal plate consumers are not improved. Shading on prices in light plates is occasionally encountered. We continue to quote:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds. Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary fire-box steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive fire-box steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The small weekly margin of increase in the volume of sheet business is being maintained. The principal producer has 47 per cent of its mills running this week, as against 46 per cent last week, and 44 per cent the preceding week. For the first time in the past four months, all of the 37 mills of the Vandergrift works of the American Sheet & Tin Plate Co. are in operation. The activity of this works at one time in that period was down to 12 mills. The orders being booked are practically all new business. There is some shading of sheet prices by small independent mills. We continue to quote:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.60c; No. 30, 2.70c. Galvanized: Nos. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 3.95c. Blue annealed: Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Tin Plate.—The healthy demand for tin plate, coming largely from the canning interests, is growing steadily. The tonnage being placed is largely on new contracts, little of the activity being due to specifications against old contracts. The American Sheet & Tin Plate Co. is operating this week 77 per cent of its total capacity, compared to 75 per cent last week, and 71 per cent the preceding week. We quote: Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The past week is reported by the local maker to have been the best in the tonnage of light rails booked since the business depression. Orders for more than 2,000 tons were entered. Sales of standard sections were confined to carloads. Re-rolling mills continue to shade official prices on light rails. Standard railroad spikes are firm at 1.70c Pittsburg, and some good orders have been placed in the past several weeks. On present specifications on Bessemer rails, we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $36; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.95 to $2.05 Pittsburg.

Steel.—There is a little more figuring being done by consumers of steel billets with the makers, but business taken is light. The revised schedule of delivered prices on billets, which went into effect the past week, equalizes the disadvantages of freights, the mill absorbing one-half of the freight when it is more than $1 a ton, and not exceeding $3 a ton. This is not a reduction of price, as the minimum remains $28 Pittsburg base. Forging billets are $2 higher. Sheet and tin bars are moving fairly actively. We continue to quote Bessemer and open-hearth billets $28 Pittsburg, and forging billets at $30 Pittsburg subject to the division of the freight charge, and sheet and tin bars at $29.50 to Pittsburg, valley and Wheeling territory, and $29 Pittsburg for delivery to other points.

Hoops and Bands.—Though the trade in hoops and bands is below the normal, it is being maintained more evenly than other finished lines with few exceptions. Prices are firm. We continue to quote the following official prices:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c; base half extras as per standard steel.

Merchant Bars.—A little better tone is noted in steel bars, but the improvement is not of sufficient magnitude to lend much encouragement to makers. March has shown a small increase in the specifications of steel bars received by some of the leading mills. Bar iron is moving a trifle less actively than steel, and the present situation is such that the leading makers are disposed to hold the price schedule firmly. The market in steel specialties shows some low prices by re-rollers. Shafting is weak. We continue to quote:

Common iron bars, 1.50c Pittsburg in carload lots and over; 1.50c in less than carloads; 1.47c to 1.50c base Pittsburg plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.60c; plow and cultivator, 1.60c; channels, angles, zees, tees, under 3 inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 56 per cent in carloads, and 48 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.80c base. Iron finished tire under 1½ by 1½ inches, 1.75c; iron finished tire, 1½ by ½ inches and over, 1.60c base. All tire subject to ½ extra on the steel card.

On cold rolled strip steel, widths 1½ inch and wider and 0.100 inch and thicker, we quote base prices per 100 pounds, $3.60 on hard and $3.75 on soft.

Structural Material.—Structural material did not move as actively in March as was anticipated, and conditions are relatively quiet for this period of the year. The railroads continue to let immediate needs govern their orders. Large projects are few. Fabricators report that the number of inquiries in March were about equal to the same month a year ago, but the aggregate tonnage was much less. Fabricating prices are low. The Riter-Conley Mfg. Co. has taken a contract to erect a large addition to the Erie City Iron Works, Erie, Pa. We continue to quote:

Beams and channels, 15 inch and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c; tees, 1.75c; angles from 3 to 6 inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.80c base.

Merchant Pipe.—With April and the

season for a normally active trade close at hand, merchant pipe makers are facing a moderately good outlook. When the relaxation of business came last fall, jobbers' stocks of merchant pipe were low and now that active consumption is beginning, old contracts are being liberally drawn against by specifications. Galvanized pipe especially is showing this effect. Line pipe for the oil and gas fields is not up to expectations as yet, though there are some good sized projects under negotiation. Prices of both iron and steel pipe are firm. We continue to quote the following official discounts of the principal maker, to consumers in large lots, with an additional one point and five off to jobbers:

	Black.	Galv.
⅛ and ¼ inch	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
⅛ to ¾ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inches	54	43

Boiler Tubes.—The gradual improvement apparent in merchant pipe is extending to boiler tubes and there is a fair volume of orders being booked, principally from the railroads. Prices are being firmly maintained. We quote the following discounts:

	Iron.	Steel.
1 to 1½ inch	42	47
1¾ to 2¼ inch	42	59
2½ inch	47	61
2¾ to 5 inch	52	65
6 to 13 inch	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Wire Products.—The wire trade continues to increase, the farming communities, particularly in the west, supporting the demand for nails, plain and barbed wire. Though not normal, the market's activity is gradually gaining and manufacturers are better satisfied. Jobbers' stocks are not large and quick shipments are being urged. Fencing demand is good. Prices are unchanged and we quote:

Wire nails, jobbers' carload lots, $2.05; retailers' carload lots, $2.10; less than carloads, $2.15; painted barb wire, $2.20 for jobbers in carloads; retailers in carloads, $2.25; and less than carloads, $2.35, with 30c for galvanizing; plain wire, 1.90c for jobbers, and 1.95c by carload.

The Lima Locomotive & Machine Co., Lima, O., has just delivered a 150-ton Shay-type locomotive to the Chesapeake & Ohio and has received an order from the Pennsylvania company for a 250-ton Shay-type locomotive. This will be the largest ever built in the Lima shops.

CHICAGO.

Activity in Structural Material—Railroad Repair Work.

Office of THE IRON TRADE REVIEW,
1362 Monadnock Block, March 31.

From the standpoint of tonnage the activity in structural material was the leading factor of the week. An aggregate of about 3,500 tons was placed of which about 2,500 tons will go into the Milwaukee viaduct. This contract went to the Milwaukee Bridge Co. at a very low figure though there was only a difference of about $14,000 between low and high bidder with seven bids submitted. The railroad situation is quiet with the exception of interest shown in track supplies. There is reason to believe that the railroads are now disposed to do considerably more spring repair work on track and roadbeds than was outlined a few months ago, which adds encouragement to a growing sentiment of optimism. There are those who basing their opinion on the increase of orders for steel in various forms received by their own mills, predict a pronounced change for the better in 60 or 90 days. Whether this be warranted or not, there certainly is a much more widespread disposition to accept it than prevailed even a few weeks ago. Transactions in pig iron are of much the same variety as for several weeks past and hopefulnes is based on the outlook rather than existing facts.

Freight Rates.—The following freight rates are in force on iron and steel products delivered at Chicago: On pig iron, per ton, from the valley, $2.40; from Pittsburg, $2.80; from Birmingham, $4.35; from Michigan points for charcoal iron, $1.50; from Virginia, $3.20. On billets and rods, per ton, from Pittsburg, $3. On iron and steel, merchant bars, structural steel, plates, rails and wire products, 18 cents per 100 pounds, for charcoal lots and 21 cents for less than carload lots. On coke, from Connellsville, $2.65.

Pig Iron.—Events of the past week in the pig iron market of themselves indicate nothing. The influence of the general feeling in trade has induced a better tone, however, and there is a marked anticipation of better things in 60 days. The sales of the week include two 500-ton lots of southern iron and one of 300 tons reported to have been placed at $12, Birmingham. The Zenith Furnace Co. sold 1,000 tons of northern iron at the end of the week to two purchasers. Several additional sales ranging in quantity from carloads to 200 tons were disposed of. The minimum price of southern iron seems to be $12 and it is not certain that the standard Birmingham irons of No. 2 grade can be bought as low as that. On the other hand, the general average of prices is lower this week and there is but little iron going at more than $12.50. These prices give to southern iron in this market a distinct advantage and only such northern iron is being bought as consumers must have. The lowest prices reported on northern iron are $17.35 delivered, the larger portion of the tonnage, which is all of the small lot variety, going around $17.50. Inquiry as to possible arrangements for taking iron still unshipped on high-priced contracts is being made by some of the consumers. This is a hopeful sign, because this iron must be taken care of before any very extensive buying on new contracts can take place, and up to this time melters have hesitated to even consider handling this expensive iron. We quote:

Lake Superior Charcoal	$21.50 to 22.00
Northern Foundry No. 1	17.85 to 18.35
Northern Foundry No. 2	17.35 to 17.85
Northern Foundry No. 3	16.85 to 17.35
Southern Foundry No. 1	16.85 to 17.35
Southern Foundry No. 2	16.35 to 16.85
Southern Foundry No. 3	15.85 to 16.35
Southern Foundry No. 4	15.35 to 15.85
Southern No. 1 Soft	16.85 to 17.35
Southern No. 2 Soft	16.35 to 16.85
Southern Gray Forge	15.35 to 15.85
Southern Mottled	15.10 to 15.60
Southern Silveries, 4 per cent Silicon	18.85 to 19.35
Southern Silveries, 5 per cent Silicon	19.35 to 19.85
Southern Silveries, 6 per cent Silicon	20.35 to 20.85
Jackson Co. Silveries, 6 per cent	21.90 to 22.40
Jackson Co. Silveries, 8 per cent	23.90 to 24.40
Jackson Co. Silveries, 10 per cent	25.90 to 26.40
Malleable Bessemer	18.00 to 18.50
Standard Bessemer	19.40 to 19.90
Alabama Basic	17.35 to 17.85

Billets and Rods.—The interest in billets despite the adjustment in price to Chicago territory consumers is confined to small lots. The Chicago, Milwaukee & St. Paul road has decided in favor of iron for its car axles and will undoubtedly furnish all the scrap necessary for their manufacture. We quote for Chicago delivery, rolling billets $29.50, forging billets $31.50. We quote, f. o. b. Pittsburg, Bessemer wire rods, $35; open-hearth rods, $36; and chain rods, $37.

Merchant Bars.—Reports concerning the buying of iron and steel by vehicle manufacturers continue to show progress. Specifications on iron bar contracts are not developing as rapidly as expected, but in this territory, so far as can be ascertained, prices are well maintained. Steel bars are enjoying an increased demand and the local store of the leading independent mill received among other smaller orders, one from the southwest for 1,500 tons. We quote for mill shipment, Chicago delivery, as follows:

Bar iron, 1.65c to 1.68c; soft steel bars and bands, 1.78c, half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel, 1.98c; iron finish, up to 1½ x ½ inch, 1.93c base tin card; iron finish, 1½ to 1½-inch and larger, 1.78c base,

steel card; channel for solid rubber tire, ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe, 1.83c; concave and convex sleigh shoe, 1.93c; cutter shoe, 2.36½c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 54 per cent off the list for carload lots, and 48 per cent off for less than carload lots. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.10c, full extras; soft steel bars, $2 per 100 pounds base, plus half extras; soft steel hoops, 2.40c, full extras.

Plates.—The buying of plates in small lots has improved. Consumers of large tonnages are not making contracts, however, and are ordering in only such quantities as can be used in the near future. One plate mill of the Illinois Steel Co. at South Chicago is running this week. We quote:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.88c to 1.91c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2.10c to 2.20c; from 72 to 96 inches wide, 2.20c to 2.30c; 3/16-inch up to and including 60 inches wide, 2.20c to 2.25c; 72 inches wide, 2.45c to 2.55c. No. 8 up to 60 inches wide, 2.20c to 2.25c. Flange and head quality, 25c extra.

Sheets.—The purchasing of sheets, particularly galvanized, continues to be a leading feature of the market. Blue annealed also are in good demand, though in the lighter gages of black sheets there is less activity. We quote for Chicago delivery from store. For mill prices, see Pittsburg report.

No. 10, 2.20c to 2.25c; No. 12, 2.25c to 2.30c; No. 14, 2.30c to 2.35c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, Nos. 10 to 16, 3.05c to 3.15c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

Structural Steel.—The letting of the contract for the Washington avenue viaduct, Milwaukee, was the leading transaction of the week. Approximately 2,550 tons of steel will be furnished and the low bid was $215,670, made by the Milwaukee Bridge Co., which bid was about $3,000 below the estimated net cost. Of seven bidders, the American Bridge Co. was high with $229,550. The Morava Construction Co. will furnish the 200 tons of bridge structurals for the draw span over the Skatgit river at Mt. Vernon, Wash., and the Pittsburg Steel Construction Co. took the contract for 364 tons for the North Denver high school. Joseph T. Ryerson & Son were awarded the contract for a small city bridge for the Illinois Central R. R. requiring about 80 tons. The Chicago, Milwaukee & St. Paul railroad placed the order for 2,500 tons of iron car axles with the Block-Pollak Iron Co. at a price understood to be below $1.80 delivered Milwaukee. As the contract undoubtedly involved the taking of this railroad's scrap by the maker of the axles, the exchange may have influenced the axle price. The Chicago, Milwaukee & St. Paul is also in the market for 500 tons of bridge structurals and the Chicago, Burlington & Quincy will let the contract for about 900 tons of steel for track elevation at the Panhandle crossing in Chicago. We quote as follows:

Beams and channels, 3 to 15 inches inclusive, 1.88c to 1.91c delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles, over 6 inches, $2.15 per 100 pounds base; beams, 3 to 15 inches inclusive, $2.05 per 100 pounds base; channels, 3 inches and larger, $2.05 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—The purchase of 80,000 rails by the New York Central R. R., the entire allotment of which has not been announced as yet, relieves the general situation, but in the west there is little interest displayed in standard sections. The Chicago, Milwaukee & St. Paul closed with the leading producer for its year's requirements of bolts amounting to 7,000 kegs and the Illinois Central is now figuring on its needs for the year. In lighter rails for traction roads and smaller railroad lines there is a very fair inquiry. We quote as follows:

Standard rails, $28 f. o. b. mill, full freight to destination; light rails, 25-pound to 45-pound, $28; 20-pound, $29; 16-pound, $30; 12-pound, $31. Track supplies, f. o. b. Joliet, angle bars, 1.65c; spikes, 1.85c to 1.95c; track bolts, with square nuts, 2.35c to 2.45c; with hexagon nuts, 2.50c to 2.60c. Small railroad and square boat spikes, 2c base, f. o. b. Pittsburg.

Merchant Pipe and Boiler Tubes.—The business of the leading producer of tubular goods has increased in March as compared with February. With the opening of navigation sometime during the latter part of this month it is expected that trade from the northwest will come in to increase the total. From store the buying of boiler tubes is very active. Jobbers are reaping the benefit of the absence of stocks usually carried by consumers and the fact that the purchases are in quantity too small to take to the mills.

We quote mill discounts, Chicago delivery, carload lots, as below. On steel pipe jobbers are allowed a concession of one point and 5 per cent additional from the schedule in force:

	—Steel— Black.	Galv.
¼ to 6 inches, inclusive....	71.2	61.2

BOILER TUBES.

	Steel.	Iron.	Seamless.
2¼ to 5 ins., inclusive..	63.2	50.2	49.2

Mill quotations on iron pipe are five points higher than the foregoing prices.

We have revised our prices from store, as below. A concession of one-half to one point from these prices is allowed by Chicago jobbers on carload orders shipped from local stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	64	48
⅜ inch	66	52
½ inch	68	56
¾ to 6 inches	72.5	62
7 to 12 inches.....	68	53

Store prices for wrought iron pipe, carload lots, from Chicago stocks, are as follows: One-eighth to ¼-inch, 59; ⅜-inch, 61; ½-inch, 63; ¾-inch to 6 inches, 68; 7 inches to 12 inches, 65. Boiler tubes from store are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1¼ inches.....	35	35	35
1¼ to 2¼ inches.....	50	35	35
2½ inches	52½	35	35
2¾ to 5 inches.....	60	47½	47½
6 inches and larger....	50	35	..

Cast Iron Pipe.—The interest of municipalities in their pipe requirements is very sluggish and uncertain. The lettings in sight are few. The Cincinnati contract for 2,000 tons is scheduled to be placed April 2. Bay City, Mich., is placing this week an order for 200 tons and last week the Dimmick Pipe Co. took the contracts for 200 tons at Jackson, Mich., and 400 tons at Muscatine, Ia. Prices are irregular and we quote 4-inch pipe, $28; 6 to 12-inch pipe, $27, larger sizes, $26; gas pipe $1 a ton higher.

Wire Products.—The activity in wire

products is without any change in character or volume. The present good volume of business may be expected to continue until June. 1. We quote to jobbers for Chicago delivery as follows:

Wire nails, $2.23; painted barb wire, $2.38; galvanized barb wire, $2.68; smooth annealed wire, $2.08; smooth galvanized wire, $2.38; polished staples, $2.23; galvanized staples, $2.63. Carload lots to retailers, 5 cents higher; less than carload lots, 15 cents higher.

Coke.—Considerable attention is being given by coke producers to the probability of a suspension of work by the miners in the coal regions. In the event of a cessation of work, and an increase in the price of steam coal, some coke operators in the Connellsville district may find it more profitable because of low coke prices, to bank their ovens and offer their coal for fuel purposes. The coke market generally, is dull with a little increase of interest in foundry grades. Production in the Connellsville district was practically unchanged in the week ending March 21. Prices show little change. For standard Connellsville foundry coke, prompt delivery, we quote $2.25 to $2.50. Other grades range as low as $2. Our quotations on standard Connellsville furnace coke are from $1.65 to $1.75 ovens, for prompt shipment. Other grades are lower.

Old Material.—An absolute lack of life is noted in old material. Dealers are finding difficulty in selling because there is no demand from the mills, and in buying as well, because the limited amount of scrap being created by the mills, is being stored by them. Railroad offerings are about the only element of activity in the market and these are commanding low figures. We quote the following nominal prices, gross tons, delivered in the Pittsburg district.

Heavy melting scrap, $12.75 to $13.25; rerolling rails, $14 to $14.25; bundled sheet scrap, $9 to $9.50; iron axles, $18.50 to $19.50; old iron rails, $15 to $16; No. 1 wrought scrap, $13.50 to $14; old car wheels, $14.50 to $15; low phosphorus scrap, $15.50 to $16; machine shop turnings, $8.50 to $9; cast borings, $7.75 to $8.25; No. 1 cast scrap, $14.75 to $15.25.

Old car wheels	$15.75 to 16.25
Old iron rails	15.25 to 15.75
Re-rolling rails (3 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and under)	12.25 to 12.75
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	11.50 to 12.00
Heavy melting steel	11.50 to 12.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.00 to 11.50
No. 2 R. R. wrought	10.00 to 10.50
Knuckles, couplers and springs	10.75 to 11.25
Shafting	13.50 to 14.00
Iron car axles	16.00 to 16.50
Steel car axles	15.00 to 15.50
Dealers' forge No. 1	9.00 to 9.50
Pipes and flues	8.50 to 9.00
No. 1 cast, 150 lbs and less	12.00 to 12.50
No. 1 mill	8.00 to 8.50
Mixed busheling (Nos. 1 and 2)	7.25 to 7.75
Country sheet	5.25 to 5.75
No. 1 boiler cut	7.00 to 7.50
Boiler punchings	10.00 to 10.50
Cast borings	4.75 to 5.25
Mixed borings, etc	4.75 to 5.25
Machine shop turnings	6.50 to 7.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Stove plate and light cast scrap	10.00 to 10.50
Old iron splice bars	14.00 to 14.50

CLEVELAND.

Very Low Pig Iron Quotations—Some Furnaces Favor Lower Ore Prices.

Office of THE IRON TRADE REVIEW, Browning Building, March 31.

Iron Ore.—Some furnace interests have started an agitation in opposition to the present prices of iron ore, but there is no concerted movement and ore interests are showing no indication of changing their prices. There is no buying of ore and it is not expected that there will be any at any time in the near future. Although some necessary repairs are being made on vessels, no active preparations for the opening of navigation are in progress. On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51.50 per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20, and Mesabi non-Bessemer, $4.

Pig Iron.—Some very low quotations are being made by valley interests. In some cases as low as $15.25 valley has been named for delivery at not far distant points, and one valley interest has sold on a basis of $14.75 furnace, for delivery in eastern Pennsylvania. This is a very unusual sale and could not be duplicated for delivery at Ohio points. Some furnaces which have large stocks of ore on hand are showing a disposition to use the ore and sell the pig iron at very low prices. Owing to the present unsettled condition of the market, and the extremely limited demand, it is difficult to quote with any degree of accuracy, but prices are nominally as follows:

Bessemer	$17.50 to 17.65
No. 1 foundry	16.75 to 17.85
No. 2 foundry	16.15 to 17.35
No. 3 foundry	15.65 to 16.50
No. 2 southern	16.35 to 16.85
Gray forge	15.50 to 16.00
Lake Superior charcoal	21.00 to 22.00

Coke.—One furnace interest has made a trade of gray forge pig iron for coke, but with the exception of this transaction, practically nothing has been done. We quote furnace coke at $1.60 to $1.75 at the ovens, and spot foundry coke at $2.25 to $2.50.

Finished Material.—Very few sales of any kind are reported. Inquiries for standard sections for traction interests which have been pending for some time have not resulted in orders. The traction companies are having much difficulty in raising money to make improvements, their earnings having suffered severely on account of the prevailing depression. Bar iron and steel bars are dull, and prices on the former are irregular. Cleveland iron mills are in operation this week, but will be idle next week. On structural material there is little business in sight, although 1,000 tons for the Youngstown courthouse and 500 tons for two bank buildings in that city are soon to be placed. There is considerable cutting in the prices of rivets. Jobbers report a very light movement from warehouses.

Old Material.—A further softening of the cast metal market was made apparent this week by a drop of $2 a ton in old car wheels. The movement of material of all sorts was at a minimum, local mills foregoing interest in the market as well as others in this district. Extensive offerings of all sorts of material by two large railroads whose lists will close this week had further tendency to cause both dealers and jobbers to pause and wait the immediate future. The following quotations, almost entirely nominal, f. o. b. Cleveland, are made:

Old iron rails	15.50 to 16.00
Old steel rails (re-rolling)	13.00 to 13.50
Old steel rails (under 6 feet)	12.25 to 13.25
Old car wheels	14.00 to 14.50
Old steel boiler plate	9.25 to 10.25
Steel axles	14.50 to 15.00
Malleable iron (railroad)	12.25 to 13.25
Malleable iron (agricultural)	10.25 to 11.25
Heavy steel	11.25 to 12.25
Country mixed steel	11.00 to 12.00
Low phosphorus	14.75 to 15.50

We quote, net tons, as follows:

No. 1 R. R. Wrought	11.25 to 12.25
No. 1 busheling	10.00 to 10.50
No. 1 machine cast	12.00 to 12.50
Iron axles	16.00 to 17.00
Axle turnings	7.00 to 7.50
Machine shop turnings	6.00 to 6.50
Grate bars	9.25 to 10.25
Pipes and flues	9.50 to 10.50
Tank iron	8.25 to 9.25
Hoop and band iron	5.25 to 6.25
Sheet iron	4.25 to 5.25
Wrought drillings	6.00 to 6.50
Stove plate	10.25 to 11.25
Cast borings	4.75 to 5.75

NEW YORK.

Structural Contracts Light—Some Improvement in Pig Iron.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., March 31.

Pig Iron.—Indications of a continuance of the moderate improvement recently noted are not lacking in this district. There is a more general dis-

position to inquire for delivery reaching over a considerable period, there is some pressure on the part of pig iron and coke consumers to secure shipments, salesmen report that foundries generally are in receipt of considerable new business at a fair price, and in point of actual sales practically all distributing concerns have found March bookings considerably in excess of those of the previous months. Added to this, the situation is steadily assuming a more healthy tone and the outlook is more promising. An inquiry is pending for 600 tons of high silicon iron for extended delivery, another is for about 600 tons of No. 1X foundry for the second half, and there is a very general sprinkling of inquiries for fair tonnages and various shipments. Sales during the past week included a lot of 2,000 tons to a Troy consumer, but it is stated that this, as well as most of the other attractive orders booked, went at prices under the general level. The British market continues strong, but high ocean rates are still preventing any further export movement, although inquiries are common. It develops that so far engagements of southern iron for export have not exceeded 6,000 tons, this being booked some time ago. The greatly exaggerated reports of foreign sales, it is believed, are emanating from freight agents to whom frequent requests for rates are made on the same lots of iron, even though on most of it no business results. We quote tidewater prices as follows:

Northern foundry No. 1	$18.00 to 18.75
No. 2X foundry	17.50 to 18.50
No. 2 plain	17.00 to 18.00
No. 2 southern foundry	16.50 to 17.00
Malleable	17.75 to 18.25
Basic	17.00 to 17.50
Gray forge	16.50 to 17.00

Ferro-Manganese.—During the past week a sale of 200 tons, for delivery running through July, has been made on the basis of $42, seaboard, said to be the lowest level in at least three years. There is a fair volume of inquiry.

Finished Materials.—Advices from Washington state that the contract for the construction of the walls of the Buffalo ship block has been awarded to the lowest bidder, the MacArthur Bros. Co., of New York City. This interest is already negotiating with a number of steel piling interests in regard to the 7,000 tons which will be needed for the work, and this tonnage will probably be closed for by the end of the week. Structural lettings continue extremely light, although a heavy tonnage of work is pending, and the leading interest has taken a surprisingly small lot of business during March, the bulk of orders being placed with independent concerns. Except in seasonable lines, new business is apparently less active than last month. Mills are being besieged with a variety of propositions, all of which amount to a reduction from established prices, but are holding very firm.

One large eastern interest has begun rolling open-hearth rails, the low price of scrap making this more profitable than Bessemer rail business. New business in cast iron pipe is light, the only recent lettings of size being placed by Reading with the United States Cast Iron Pipe & Foundry Co. A Cuban railroad is reported to have taken 2,000 tons of rails.

The bar iron situation is quiet, with no change in regard to prices. Local sheet and plate business is light, though the former is expected to benefit somewhat from the movement inaugurated to render school buildings more nearly fireproof. Some business is also expected to result from the recent placing of important orders for steel cars and steel underframe cars, and the Brooklyn water works proposition is soon to come into the market. There is considerable grade crossing work to be let in the Philadelphia district. Local ship yards are buying scarcely anything at present. We quote: Angles, 3 to 6 inches x ¼ inch and heavier, 1.86c; beams, 3 to 15 inches, 1.86c; tees, 3 x ¼ inch and heavier, 1.91c; plates, carloads, tanks, 1.86c; marine boilers, 2.26c; bar iron, 1.56c; soft steel bars, 1.76c; sheets, No. 28, black, 2.66c.

Old Materials.—The demand is light and business is of limited proportions, though the present price level is being well maintained. Mills are buying sparingly, and in several lines, notably heavy melting steel, are unwilling to pay the level at which the scrap can be secured in this city. We quote, gross tons, New York City, as follows:

Old iron rails	$15.50 to 16.00
Old steel rails, re-rolling	14.50 to 15.00
Relaying rails	20.00 to 21.00
Old car wheels	14.00 to 14.50
Old iron car axles	17.00 to 17.50
Old steel car axles	15.50 to 16.00
Heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	13.00 to 13.50
Iron track scrap	11.50 to 12.00
Wrought pipe	9.00 to 9.50
Cast borings	5.00 to 5.50
Wrought turnings	7.50 to 8.00
Heavy cast scrap	13.50 to 14.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.00 to 10.50
Stove plate	10.00 to 10.50
Grate bars	9.50 to 10.00

Charles Millar & Son, Utica, N. Y., have received from the board of contract of Albany a contract for 183 tons of 6, 8 and 12-inch cast iron pipe at $23.50 per ton.

CINCINNATI.

Pig Iron Continues Dull With Low Prices Prevailing.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., March 31.

Pig Iron.—Dullness continues to characterize the pig iron market in this territory. The only sale of importance was the booking of 1,000 tons of analysis iron, which was followed by an inquiry for 4,000 tons for delivery over the last half of the year. Two inquiries, of 500 tons each, one for No. 3 foundry from a local consumer, and another for No. 2 soft, are pending. Aside from these inquiries, the business seems to be made up of scattering small lots of from 25 to 50 tons, covering immediate requirements. There is no general interest in future requirements and on the occasional inquiries for second half delivery, furnaces are not inclined to make quotations. The undertone to the market is weak and southern pig iron is more generally quoted at $12 Birmingham than was the case at the beginning of the month, when that price was quoted quietly as a special inducement. In northern iron, there is but little doing, although it is generally accepted that $15.50 at furnace could be done on No. 2 foundry. Jackson county silvery 8 per cent silicon remains steady at $19 at furnace. There appears to be no improvement in the consumption. It is reported that several northern stacks are preparing to blow out in the near future. The recent reports as to stocks of pig iron have had no appreciable influence on the market, as the condition of furnace stocks had practically been discounted before the publication. We quote for prompt delivery second quarter, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows.

	PER TON
Southern foundry No. 1	$15.75 to 16.25
Southern foundry No. 2	15.25 to 15.75
Southern foundry No. 3	14.75 to 15.25
Southern foundry No. 4	14.25 to 14.75
Southern No. 1 soft	15.75 to 16.25
Southern No. 2 soft	15.25 to 15.75
Southern gray forge	13.50 to 13.75
Northern No. 1 foundry	17.20 to 18.20
Northern No. 2 foundry	16.70 to 17.70
Northern No. 3 foundry	16.20 to 17.20
Northern 8 per cent silicon	20.20 to 21.20

Finished Material.—Requisitions on contracts and new business has shown a slight improvement in March over February. Business at the stores has continued fair.

Coke.—The market is quiet and there is a slightly easier tone, so that it is difficult to make sales above minimum prices. Requisitions on contracts are moderate and the call

for spot coke limited. Prices in the leading coke producing districts are as follows:

Wise county furnace coke	$1.75 to 2.00
Wise county foundry coke	2.25 to 2.35
Pocahontas furnace coke, prompt shipment	1.65 to 1.90
Pocahontas foundry coke	2.00 to 2.25
Connellsville furnace coke, prompt shipment	1.70 to 1.90
Connellsville foundry coke	2.25 to 2.50

Old Material.—The market remains dull and easy with some quotations slightly lower than a week ago. Dealers report a slight demand from melters and but little call for scrap on contracts. Dealers' prices f. o. b. Cincinnati are as follows:

Old No. 1 R. R. wrought, net tons	$11.00 to 12.00
Cast machine and fdy., net tons	12.00 to 12.50
Old iron rails, gross tons	16.50 to 17.50
Old steel rails (re-rolling) gross tons	12.50 to 13.50
Old short lengths, gross tons	12.50 to 13.50
Old iron axles, net tons	16.50 to 17.50
Heavy melting scrap, gross tons	11.50 to 12.50
Stove plate, net tons	9.50 to 10.50
Wrought turnings	5.50 to 6.50
Cast borings, net tons	4.50 to 5.50
Car wheels, gross tons	16.50 to 17.50

The Domhoff & Joyce Co. has been appointed selling agent for the Sloss-Sheffield Steel & Iron Co., in the central west. Robert Field became connected with the Domhoff & Joyce Co. April 1. J. C. Layne Jr., formerly with the Robert Field Co., has taken service with Eafon, Rhodes & Co. of Cincinnati.

PHILADELPHIA.

Malleable Iron Purchased—Order for Five Hundred Cars.

March 31.

Pig Iron.—So far as new business is concerned, the past week has been extremely quiet. Orders have been few, and generally for small amounts, and while there have been a number of inquiries, consumers seem in no haste about buying. Two of the largest orders placed were for malleable iron. One of 1,250 tons was divided between an Ohio furnace, which secured 500 tons, and a central Pennsylvania furnace, which took the balance, at approximately $17.75 a ton delivered in the purchaser's yard near Philadelphia. An order for 800 tons of the same grade of iron was placed by another interest at figures not made public. A Scranton firm is also reported to have bought 500 tons of No. 2X iron from an independent furnace at $17.50 a ton. Southern iron continues to come into the market at prices below the scheduled figures. Such sales, however, are not large and only seem to strengthen the furnaces that have agreed to maintain prices in the stand they have taken. This stand is not that they are determined to maintain quotations at an arbitrary figure, but that they are resolved not to sell below cost, and that they cannot cut prices without suffering an actual loss. In carrying out this policy a company which has eight furnaces in the Lehigh and Schuylkill valleys was today to blow out its seventh furnace, leaving only one in operation to fill the reduced current demand. With the reservation that independent and southern iron can frequently be had from 25 to 50 cents cheaper than the scheduled figures, which are based on standard grades, prices show no change and may be quoted as follows:

No. 1X foundry	$18.75 to 19.25
No. 2X foundry	18.25 to 18.50
No. 2 plain	17.75 to 18.00
Standard gray forge	16.50 to 16.75
Basic	17.25 to 17.50
Low phosphorus	23.50 to 24.00

New Material.—Structural material seems to occupy the best position among finished products, and demand shows a slight improvement as spring advances. It is perhaps significant that the building permits taken out in Philadelphia yesterday were the largest for a year, and that ground was broken for a grand opera house which will probably require at least 1,000 tons of steel. Plates also show a little more activity, and as an indication of railroad needs it is worth noting that the Lehigh & New England railroad, a comparatively small line, placed orders for 500 new cars, of which 250 are to be steel gondolas and 250 steel and wooden box cars. Prices show no change, as follows: Structural material, 1.85c to 2c, according to specification; plates, 1.85c to 1.90c; steel bars, 1.75c to 1.80c; refined iron bars, 1.65c.

Old Material.—Scrap seems to be on the toboggan again, and most lines show a further decline. This is due to the failure of the mills to place any but the smallest orders. Prices follow:

Old steel rails	$14.75 to 15.25
No. 1 steel scrap	12.75 to 13.25
Old steel axles	17.00 to 17.50
Old iron axles	19.50 to 20.00
Old iron rails	16.50 to 17.00
Old car wheels	15.50 to 16.00
Choice scrap R. R. No. 1 wrought	14.50 to 15.00
No. 1 yard scrap	13.00 to 13.50
Machinery scrap	15.00 to 15.50
Low Phosphorus scrap	17.50 to 18.00
Wrought iron pipe	11.50 to 12.00
No. 1 forge fire scrap	10.50 to 11.00
No. 2 forge fire scrap, ordinary	9.00 to 9.50
Wrought turnings	9.00 to 9.50
Axle turnings, heavy	10.50 to 11.00
Cast borings	7.50 to 8.00
Stove plates	11.00 to 11.50

The Refined Iron & Steel Co., Pittsburg, began operating its mill double turn on March 24. The company has enough business booked to insure its operation on this basis for about a month.

BUFFALO.

Extremely Dull Month in Pig Iron—Rail Mill Started.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, March 31.

Pig Iron.—March has been the dullest month in local pig iron circles since the panic last fall. To tell the story in the matter of inquiries and sales would be but to repeat what has been characteristic of the last three months preceding. There is very little iron being sold and a good portion of what is going is marketed at cut rates. The lower prices are being made by the southern furnace interests. One large foundry here, which has been operating on short time, has closed down completely. Yet another is preparing to resume operation, its bookings being mostly for machinery castings. It is impossible to make a catalog of prices that would be accurate. We quote the following as being fairly representative of a broken market:

No. 1X foundry	$17.80 to 18.30
No. 2X foundry	17.30 to 17.80
No. 2 plain	16.80 to 17.30
No. 3 foundry	16.30 to 16.80
Malleable Bessemer	17.50 to 18.00
Gray forge	15.50 to 16.00
Charcoal	22.50 to 23.50

Finished Materials.—The Lackawanna Steel Co. Monday put its heavy rail mill back into commission after several weeks' idleness. The billet, sheet bar and plate mills, as well as the Bessemer converters, are also in operation. In structural lines, interest here centers in the proposed new federal building at Ithaca and a proposed permanent exhibit hall to be erected on the New York state fair grounds at Syracuse, 160 x 500 feet, to cost $220,000.

ST. LOUIS.

Inquiry for Basic Results in Order for Reduced Tonnages.

March 30.

Pig Iron.—A fair volume of business was secured last week, covering immediate shipments and for delivery during the next three to six months on a basis of $12.25 to $12.50, f. o. b. Birmingham, for No. 2. More inquiries and actual orders were received than have been booked for some time, and the situation generally is regarded as brighter. It is reported that the steel foundry which put out an inquiry for 5,000 tons basic iron a few weeks ago decided to place only 1,000 tons, but the price could not be learned. Our quotations, Birmingham basis, to which $3.75 freight is to be added, follow:

No. 1 southern	$12.75 to 13.25
No. 2 southern	12.25 to 12.75
No. 3 southern	11.75 to 12.25
No. 4 southern	11.25

Coke.—Very little new business developed in the coke line, but contract customers are calling for shipments in a much more satisfactory manner, thus indicating that their melt of iron is increasing. Prices remain about the same as follows: Connellsville selected, 72-hour coke, $2.25 to $2.75 ovens, for prompt and future shipment. Furnace coke, 48-hour, $1.60 to $2, ovens. Virginia and West Virginia selected 72-hour foundry coke, $2.25 for shipment up to July 1, and $2.50 for shipment from July 1 to Jan. 1, 1909; 48-hour furnace coke is selling at from $1.75 to $2 for prompt and future shipments. The present freight rate from Connellsville is $2.80 to East St. Louis and $2.90 to St. Louis. The freight rate from Virginia is $2.80 to East St. Louis, $2.90 to St. Louis and $2.40 when destined beyond.

Finished Material.—Some activity was manifested in the building line last week by the announcement that within a short time bonds would be placed on the market for the new 11-story city hospital building to cost $800,000, and the Coliseum and Commercial building at Jefferson and Washington avenues, to cost $275,000. Plans for both structures have been prepared.

Old Material.—No change in the present dullness of the market was reported last week. Our quotations on scrap iron follow:

Cast iron borings, free from foreign material, net ton	$ 5.00
Steel axle turnings, net ton	8.00
Steel railroad axles, net ton	14.00
Iron railroad axles, net ton	15.50
Miscellaneous steel scrap, gross ton	10.50
Cast iron borings (free) net ton	4.00
Old car wheels, gross ton	16.00
No. 1 railroad cast scrap, net ton	11.00
Heavy machinery cast, net ton	12.00
Stove plate and light cast, net ton	10.00
Sheet iron, net ton	4.00
No. 1 railroad wrought, net ton	12.00
Railroad malleable, net ton	11.50
Heavy melting steel, net ton	10.00

BIRMINGHAM, ALA.

Slight Improvement in Pig Iron—Quotations Vary.

March 30.

The pig iron market in the southern territory is improving and while the business being placed among the producers is not yet in much larger sized lots than it has been for some weeks, there is a demand being made for quick delivery. The Republic Iron & Steel Co. has two furnaces in blast at Thomas, near here. The Alabama Consolidated Coal & Iron Co. will this week, about Friday, blow in one of the Gadsden, Ala., furnaces and get the other furnace at the same place in readiness for the torch. At a meeting of the board of directors of the Alabama Consolidated last week in New York, a bond issue amounting to $5,000,000 was authorized and the proceeds from this deal will be used in making improvements, further development and for working capital. Guy R. Johnson, vice president and general manager of the company, on his return to the Birmingham district, announced that one of the furnaces at Gadsden would be started up immediately and that, just as soon as the market warranted it, the other iron maker would be put in readiness. This company has but little iron on the yards, two furnaces at Ironton now being in blast.

Quotations are still between $12 and $13, No. 2 foundry. Reports continue to differ, selling agents reporting under $13 per ton and at general offices the $13 rate is mentioned.

Announcement is made that a large amount of heavy machinery will be placed throughout the big steel plant of the Tennessee Coal, Iron & Railroad Co. (United States Steel Corporation), at Ensley. It will take between three and six weeks to place the machinery and during that time the plants are to be closed. The labor, however, will be taken care of and all who desire to will be given employment in placing the machinery. It is stated that, when the machinery has all been placed, the plants will be able to produce something like double the present amount. The operations at the steel plants at Ensley, belonging to this company, have been steady for some time.

The Central Foundry Co. at Bessemer is doing fairly well. The first week's operation, after an idleness since Christmas week, showed good results. There are indications that the United States Cast Iron Pipe & Foundry Co. will shortly order a general resumption of operations at both their Bessemer and Anniston cast iron pipe plants.

Prominent iron men who have been visiting this district, among them William Rogers, senior member of Rogers, Brown & Co., state that conditions in this district are much better than at other places, in comparison, and that the prospects are very bright for the southern territory. General Supt. Hayes, of the cast iron pipe plant of Bessemer, who was in Louisville, Ky., last week, is reported as saying that conditions in other iron centers are worse by far than they are around Birmingham.

We are advised by the American Iron & Steel Association that it expected to have its new directory off the press by the end of March.

BRITISH IRON MARKET.

Advances in Pig Iron and Billets—Reduction in Finished Steel.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 21.

The pig iron department continues to have the best of the iron trade. Yesterday there was a scarcity of cash Cleveland warrants, and deals were recorded at 15s 9d ($12.66) to 51s 8½d ($12.65) which represents a slight improvement on the week; sellers are not at all anxious to do business, having several weeks' work on hand. Connal's stocks today are 84,045 tons, which is about a thousand tons less than last week. The excellent continental demand is the principal explanation of the strong position, although shipments for March so far are not quite equal to those for the same period in February. Unless trade is exceptionally bad, there must be an improvement during the next month. Hence the outlook for sellers is distinctly bright. A large proportion of the continental business is through the port of Hamburg.

The one unhealthy feature is the fact that forward buying is 2 shillings below the price for cash, and this points to a lack of confidence. In the Midlands, there has been a great amount of business done during the past fortnight, one furnace alone having booked 9,000 to 10,000 tons. In this district, buyers appear to have concluded that the present is an advantageous time to buy. Athough definite advances have not taken place around Birmingham, there is an end of the shading consequent upon the recent scramble for orders. The hematite trade maintains its recent improvement, mixed numbers realizing 59 shilling ($14.44) for east coast qualities.

Pig iron prices are now more than 4 shillings above the minimum reached early in the year. The trade in steel billets has apparently commenced an upward movement, as the price is now quite 5 shillings better than it was, both for Bessemer and Siemens qualities, and this advance has been effected without apparently giving the slightest opening to foreign competition. Some little German material is coming, but, as far as can be ascertained, the competition is restricted to German steel hoops, strip, wire, and small bars. German wire is spoken of by British makers as a serious competitor. Little is heard of German iron, and quite a notable feature of the present depression has been the practical absence of foreign material.

One of the queer anomalies so frequently recorded of late is the reduction of 5 shillings in finished steel, in which Scotland took the lead, the Scotch Steel Makers' Association at Glasgow reducing prices 5 shillings per ton. At that time, three Lanarkshire steel works had been idle for a week through lack of orders. In regard to finished materials generally, there is very little ordering forward, but the orders for immediate requirements are slightly heavier, though they are insufficient to keep all the mills fully engaged, but a more hopeful feeling prevails.

METAL MARKET

NEW YORK.

March 31.

Copper.—Considerable improvement was noted in the situation during the past week and prices advanced slightly on the strength of better buying both at home and abroad. On Monday, however, the London market dropped sharply, though the New York market remained firm with business moderate. We quote: Lake, 13⅛c to 13⅜c; electrolytic, 13⅛c to 13¼c; casting, 12⅞c to 13c.

Pig Tin.—There has been a vigorous market, both on domestic and foreign account, with a steady advance in the London market and a corresponding rise in this market. We quote 32c to 32⅛c for spot metal.

Pig Lead.—London prices have slumped off somewhat, but local prices are firm and unchanged with business moderate. The current level for spot metal is 3.95c to 4c.

Spelter.—The situation has succeeded in holding its own in a dull market, the present price being 4.60c to 4.70c for spot delivery.

Antimony.—The market is weak, with sales light. We quote: Cookson's, 8⅞c to 9⅛c; Hallett's, 8½c to 9c; ordinary brands, 7¾c to 8¼c.

CHICAGO.

March 31.

The metal market of the past week showed signs of returning animation. Copper, in small lots, sold fairly well and lead has gained in strength. Tin prices are highest for a number of weeks. We quote:

Lake copper, 14c to 14¼c; casting, 13½c to 13¾c; pig tin, 33½c to 34c; spelter, 5c to 5.10c; pig lead, desilverized, 4.10c to 4.25c in 50-ton lots; corroding, 4.60c to 4.75c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list, f. o. b. LaSalle, in car lots of 600-pound casks; Cookson's antimony, 12½c to 13c; other grades, 12c to 12½c.

Prices of old metals are unchanged from the quotations of a week ago. To jobbers, we quote, as follows:

Copper wire, 11c; heavy copper, 11c; light copper 10¼c; heavy red brass, 10c; heavy yellow brass, 8c; light brass, 6c; No. 1 red brass borings, 8¼c; No. 1 yellow brass borings, 7c; brass clippings, 8c; tea lead, 2⅞c; lead scrap, 3⅛c; zinc, 3¼c; tin pipe, 25c; tin foil, 21c; pewter, 16c; electrotype plates, free from wood, 3¾c; electrotype dross, 2½c; stereotype plates, 4¼c; stereotype dross, 2⅞c; prime slab zinc dross, $62 per ton.

ST. LOUIS.

March 30.

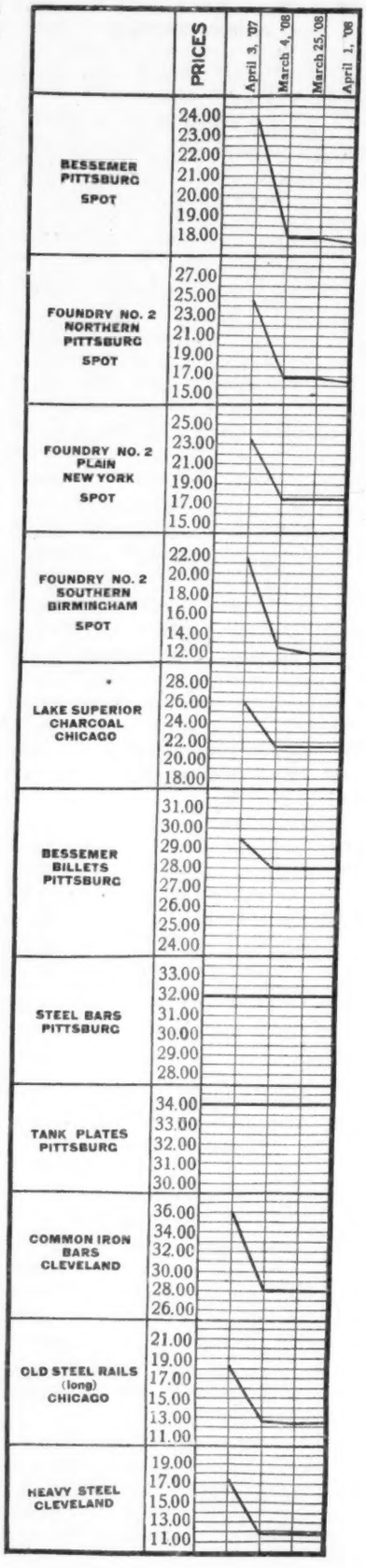
Lead and Zinc.—The highest price paid for zinc ore in the Joplin district last week was $39.50 per ton, on a base price of $36 per ton of 60 per cent zinc. The base ranged as low as $34 on less desirable grades of ore. Buying was strong all during the week on a $35 base, and a few bins of ore that sold a week ago at $35 base price were advanced to $36 base. All of the ore in the bins has been purchased, with the exception of probably 2,000 tons, by interests in position to control the spelter market.

The zinc market has not been purchased up so closely since the stringency began, and it is regarded as an indication of strength for zinc for the opening of spring.

Lead ore was freely sold at $52 per ton, with unconfirmed rumors that $53 and $54 had been paid.

Students Visit Industries.—A delegation of 75 electrical and mechanical engineering students of the Ohio State University, visited Pittsburg, March 30 and 31, on their annual inspection tour of industrial plants. Among the works visited by the students, were those of the Westinghouse Machine Co., Westinghouse Air Brake Co., Westinghouse Electric & Mfg. Co., National Tube Co., Union Switch & Signal Co., Standard Underground Cable Co., Crucible Steel Co. of America, Jones & Laughlin Steel Co., and the Edgar Thomson works of Carnegie Steel Co. Wm. T. Magruder, professor of mechanical engineering, and G. A. Anderegg, professor of electrical engineering, were in charge of the party. From Pittsburg the students went to Buffalo and other eastern cities, and continued their inspection.

PRICE CHART.



WORKING AGREEMENT

Of Western Bar Iron Association and the Amalgamated.

A new continuous working agreement has been entered into between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The agreement contains some radical modifications of the compact that has been in force between the two organizations, and that between the Amalgamated Association and the Republic Iron & Steel Co., which was recently annuled by the latter company.

The important revision of the present agreement relates to the conciliation board. This limits to one the number of disinterested parties who shall act, as a last resort, in conjunction with the representatives of the two associations, where conciliation is made necessary by a failure to reach an understanding over the annual wage scale. The one disinterested party is to be chosen jointly by the representatives of both sides. The old agreement provided for the selection of two disinterested parties each, by the representatives of both employers and the men, and these four in turn selected a fifth disinterested party to the conciliation conference from 20 names, 10 of which were submitted by each association.

The old system was regarded as unwieldy, in that the conciliation board meeting with the conference committee, made a body which might be of more than 40 persons. Under the new rule, when conciliation is made necessary, a sub-committee of six persons, three from each of the two associations, is provided to meet apart from the conference committee, and discuss the scale. Should this committee be able to reach an agreement, after the conference committee had failed, this will be binding upon both manufacturers and the men. In the event the sub-committee is unable to effect a compromise, the single conciliator is called in to make a decision. This finding, however, is not final, and must be referred back to the conference committee for ratification. The operation of the conciliation clause of the old agreement, was the ground upon which the manufacturers had based their objections, and mutual willingness to confer upon this point, by the union and the employers, has resulted in the change of the rule.

The new agreement will be in effect at the coming annual wage settlement, which will be considered about June 1, and the procedure outlined by it may then be followed, in case recourse to it is made necessary by a failure of the associations to reach an agreement at their regular conference. The Amalgamated Association will meet in convention May 5, and immediately after the adjournment of that session, the wage question will be considered. The scale under which the mills are operating at the present time, will not terminate until June 30.

The continuous working agreement was first proposed by the Republic Iron & Steel Co. and adopted in 1901, and it has been in effect ever since. Its primary object has been to avoid any closing of the mills in case of a disagreement over wages in the conference committee. Only in two instances, 1904 and 1907, has the conciliation clause been called into effect because of a disagreement in the conference committee.

It has been provided that the working agreement may be discontinued at the option of either party, up to a certain date before March 15, and the Republic Iron & Steel Co. recently took advantage of this clause in notifying the union of its desire to annul. The Republic company continues bound by the wage scale reached by the conciliation board in 1907, until June 30, 1908.

The new agreement with the Western Bar Iron Association is effective upon 11 companies, controlling 13 mills, independent of the United States Steel Corporation and the Republic Iron & Steel Co. It covers the scale for both iron and steel bars, and the puddle mill scale.

At the recent conference between the Western Bar Iron Association and the Amalgamated Association, at which the new agreement was made, the manufacturers were represented by S. C. Leonard, of the American Car & Foundry Co., Detroit; J. E. Kreps, of the Union Rolling Mills Co., Cleveland; and J. H. Nutt, secretary of the association, and the men by President P. J. McArdle and Secretary and Treasurer John Williams, of the Amalgamated Association of Iron, Steel & Tin Workers, Elias Jenkins, Youngstown, O., and Joseph Grandidier, New Albany, Ind.

B. & L. E. Earnings.—The annual report of General Manager Utley, of the Bessemer & Lake Erie railroad for the year ending Dec. 31, 1907, shows an increase for the year of $366,187.35, and an increase in tonnage of 864,022 tons. The operating revenue aggregated $6,376,952.16. The operating expenses reached $3,631,677.65, an increase of $600,350.83. The net revenue from operations was $2,745,274.51, a decrease of $234,163.48. The number of net tons freight carried earning revenue was 11,335,361. The revenue from passengers carried was $299,035.66, an increase of $11,485.86.

EMPLOYERS CONFER WITH UNIONS.

(Special Correspondence.)

San Francisco, March 23.—Referring to the letter sent to THE IRON TRADE REVIEW by Secretary H. F. Davis, of the California Metal Trades Association, stating that your correspondent has gained a mistaken impression of the meaning of the conference held between one division branch of his association and representatives of the housesmiths' and structural iron workers' unions, your correspondent reiterates the following facts:

A committee from the California Metal Trades Association conferred with the representatives of the unions, in the rooms of the association, and urged upon the union workers the necessity of protecting and fostering home industry, by excluding material brought from the east, and insisting that owners of property, builders and contractors give material manufacturers at home the preference, in every case in which the material can be supplied by local manufacturers. It was also urged that the unions directly interested in home manufacture of structural iron secure the aid of all crafts engaged in the building industry, through the Building Trades Council, to handle material of home manufacture, and refuse to work on buildings on which imported structural iron is used, if such action should become necessary, in order to bring owners and contractors to a proper realization of their duty to patronize and foster home industry.

The Building Trades Council, at a recent meeting, received a communication from the California Metal Trades Association, reminding the council of the request made by the iron workers' unions affiliated with the council, and asking what had been done by the council, if anything, in that direction, and whether the council had taken any action to keep the trade at home, or permit the patronage to be diverted from the home market.

Whether the word, "boycott" was used during the conference or in the communication from the Metal Trades Association, is immaterial; the intent is the same, and the facts that the local manufacturers are trying to exclude imported structural iron, and force builders and owners to place orders with local manufacturers, through the unions, are the same, and cannot be denied truthfully.

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HIGH AIMS OF THE NATIONAL METAL TRADES ASSOCIATION.

Like the soldier, who, returning from many battles, lays his weapons aside, happy to engage in the pursuits of peace, the members of the National Metal Trades Association, after winning a hundred conflicts with organized labor, assembled in New York last week, not to gloat over their triumphs, but thoughtfully to plan for the betterment of their employes. After the annual reports were submitted, little was heard about strikes but a great deal about industrial education and the social betterment of workingmen.

Commissioner Wuest admiraly stated the aims of the association to be to stand for all that is best for employer and employe by creating and maintaining the open shop; to encourage industrial education and to oppose pernicious class education. In the discussion of educational topics, the report of Mr. Lodge concerning the excellent work being done at Winona Technical Institute, the address of Prof. Schneider, of University of Cincinnati, on the novel plan of trade education so successfully adopted in that institution, the stirring speeches of Mr. Geier and Mr. DuBrul, and the scholarly address by President Pritchett at the banquet, were most important contributions to the solution of a difficult problem. Hardly less noteworthy, although occupying much less time, were the remarks of Mr. Steedman, of St. Louis, in moving a vote of thanks to Messrs. Schneider and Geier, and of Mr. Eells in accepting the election as first vice president of the association. Both of these speakers took the ground that while the National Metal Trades Association is, to some extent, necessarily a militant organization, there is a better and broader field of work for it which should appeal to all its members. When Mr. Geier with eloquent words pictured the gloomy outlook of the average workingman, declared that there will always be organized labor, that shorter hours and higher wages are inevitable, and that in order to meet the new conditions, the efficiency of the workingmen must be greatly increased, he not only touched the hearts of his hearers, but indicated that enlightened selfishness and altruism alike demand the uplifting of the men who toil.

Concerning the third object of the association, as stated by Mr. Wuest, that is, opposition to pernicious class legislation, the paper of Mr. Dunlap and the brilliant speech of Judge Speer were notable productions. The bills providing for the amendment of the Sherman anti-trust act and amending the law concerning injunctions had just been introduced in congress, and to Judge Speer belonged the distinction of being the first to deliver an able and fearless attack upon the new measures. We publish his address in full and commend it to the thoughtful consideration of our readers.

On the whole, whether viewed from the standpoint of cold-blooded business or in a loftier spirit, the recent convention must be regarded as a decided success.

PIG IRON STILL FLUCTUATES.

Just one year ago, under a heading identical with the above, THE IRON TRADE REVIEW of March 28, 1907, noted that since the boom of 1899, the tumble of prices in 1900 and the formation of the United States Steel Corporation in 1901, prices of finished steel products had been comparatively steady, but as to pig iron it was said: "The fluctuations have, perhaps, been as extreme as they have been at any time in the history of the American iron trade." A brief review was had of the great fluctuations in history, and a comparison with the more recent fluctuations showed that there had been little, if any, change in the violence of the price movements in pig iron. The editorial closed with the sentence: "Pig iron is, however, a fluctuating commodity, and is destined to continue to fluctuate probably as much as it has in the past."

A year's developments have shown the truth of the observation. Pig iron was advancing at the time it was made, but within two months a high point had been reached, and shortly thereafter a steady decline was inaugurated which has continued to the present.

There is nothing abnormal about these fluctuations, and there is no reason why this decline should not have been expected to come some time. The past movements have in several instances been out of harmony with finished steel prices, which have remained stationary when pig iron has advanced, and also when it has declined. A comparison of prices of all grades and all classes of delivery would be unwieldy, and the following is, therefore, made, covering No. 2 foundry pig iron at valley furnace, with ordinary deliveries when the market was low, and moderately forward delivery when the market was high and tightly sold up for the immediate future:

Jan. 1, 1899, $9.50;
Dec. 1, 1899, $22.00;
Advance, $12.50 in 11 months.

April 1, 1900, $22.00;
'00, $14.00;
$8.00 in six months.

Oct. 15, 1901, $13.50;
June 1, 1902, $22.00;
Advance, $8.50 in 7½ months.

April 1, 1903, $22.00;
Nov. 1, 1903, $13.50;
Decline, $8.50 in 7 months.

June 15, 1906, $16.00;
May 15, 1907, $23.50;
Advance, $7.50 in 11 months.

May 15, 1907, $23.50;
April 1, 1908, $15.50;
Decline, $8.00 in 10½ months.

The last decline might have been set down as one of $5.50 in six months, dating from Sept. 1, 1907, when the market was $21.00. On either basis, the decline is not markedly different from those which have occurred in the past, unless it be that it has been slightly less violent. Less violent the previous advance certainly had been, as the market required 11 months to advance $7.50, and yet at the time the market was regarded as advancing violently. There were furnacemen who were greatly disturbed when pig iron crossed the $20 line.

The pig iron decline in 1900 was accompanied by a general decline in finished steel products; the pig iron decline in 1903 was not so accompanied. Some steel products declined in that year, but the big reductions in wire products, structural shapes and plates were not made until the latter part of the following year, at a time when pig iron was beginning to show a tendency to recover.

The decline in pig iron and the maintenance of finished steel prices at this time do not, therefore, present a distinctly novel movement in iron and steel market fluctuations.

It will be noted that the decline in 1903 was to $13.50 on Nov. 1, or to a point $2.00 lower than the market at the beginning of this month. The 1903 price on Mesabi non-Bessemer ores was $3.20, while the price for 1904 was reduced to a minimum of $2.35. The 1908 price has been fixed at $4.00, the same as for 1907. The difference in actual ore cost to furnaces is greater than these quotations would indicate, since the base of metallic contents has been reduced, and the ores have actually gone down besides, requiring more flux and fuel. A price of $15.50 for No. 2 foundry iron is lower, relative to cost of production, than $13.50 was on Nov. 1, 1903. There have been suspicions that some of the recent low prices on pig iron have been made because the furnaces did not feel sure that present ore prices would be maintained. If such is the case, it is probable that the outcome will not be in accordance with the expectations. The attitude of the ore interests affords no warrant for assumption that any lower prices will be made on ore during the season, which runs theoretically to May 1 of next year. Hitherto prices once fixed for the season have remained and no reason is apparent for expecting a departure this year. A discovery that no departure is to be made may, indeed, become a cause for a slight reaction in pig iron prices by midsummer.

A BILL TO DEMORALIZE INDUSTRIES.

The so-called Gardner eight-hour bill now pending in the national house of representatives, might well be dubbed "an act to demoralize manufacturing industries in the United States."

The present law requires that employes engaged upon any of the public works of the United States shall be restricted to eight hours, but the Gardner bill goes farther and provides "that every contract hereafter made to which the United States, or any territory, or the District of Columbia is a party, and every such contract made for, or in behalf of, the United States, or any territory, or said district, which may require or involve the employment of laborers or mechanics shall contain a provision that no laborer or mechanic doing any part of the work contemplated by the contract in the employ of the contractor or any subcontractor contracting for any part of said work contemplated shall be required or permitted to work more than eight hours in any one calendar day upon such work." The courts have held that the words "public works" contained in the present law refer to federal buildings, harbor improvements and other strictly public work, but do not include employment on building battle-ships and other kinds of service for the government. The clause of the Gardner bill which we have quoted seems clearly to provide that a mill turning out steel, or a plant making rivets or a concern furnishing any other material on a government contract would be obliged to be on an eight-hour basis or present the spectacle of having some of its employes working under the eight-hour system and some for longer periods.

In fact, we believe that the bill carried to its logical conclusion would apply to the making of the pig iron that went into the steel and even to the mining of the ore used in the making of pig iron.

Such drastic provisions would be utterly unreasonable and would compel many contractors to decline to bid hereafter on government work.

When competition and general conditions have made it possible to reduce the hours of laborers by agreement of employers and employes, it has been done, but any attempt of the government to force employers and employes to work on the eight-hour basis is neither wise nor just.

The house committee on labor has recently heard most emphatic protests from representatives of steel plants, machinery manufacturers and others now doing business for the government. The general superintendent of the Bethlehem Steel Co. gave convincing testimony that in making gun tubes and in doing work on other government contracts it is impossible to work on the eight-hour basis. He cited one case in which, on account of the illness of a workman, it was necessary to put a new man on the job and a gun tube valued at $15,000 was lost. He said that in doing work requiring a high degree of accuracy, it is absolutely necessary for one workman to carry on the job from its inception to its conclusion.

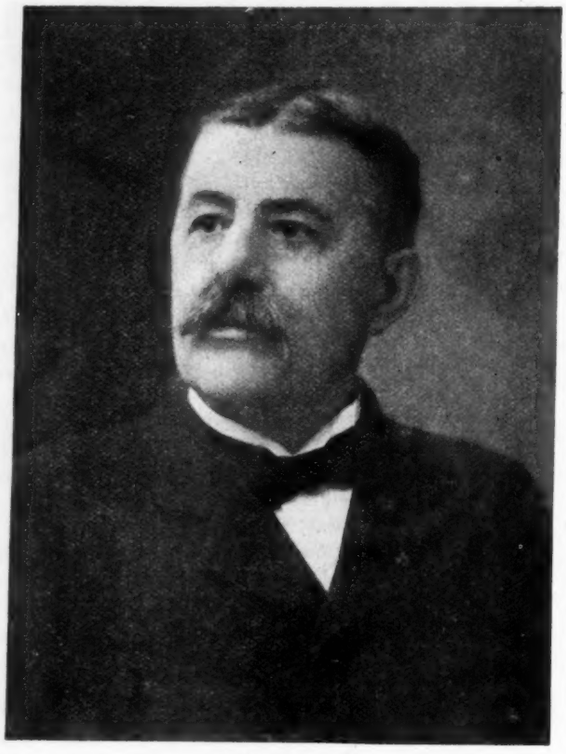
In defense of the bill, it may be pointed out that the second section provides that nothing in the act "shall apply to such materials or articles as may usually be bought in open market." Either this exception would nullify the bill by including practically everything that the government purchases, or it would result in endless controversy as to what the exception means.

The attempt to pass this bill is simply an effort of labor agitators to accomplish by law what they have been unable to accomplish by appealing to the employers and employes. These agitators hope, by catering to politicians in congress, to force the adoption of a system for which many industries are not prepared. Such a law would be a revolutionary departure in the way of government regulation, and we do not believe that any member of congress who has statesmanlike qualifications will give it his support.

DEATH OF W. H. PFAHLER.

A few days after the tenth annual convention of the National Metal Trades Association assembled in New York and, with enthusiasm, re-elected him an honorary member of its administrative council, W. H. Pfahler died at Pasadena, Cal. There, surrounded only by a few of the immediate members of his family, he passed away March 29.

Mr. Pfahler was born at Columbia, Pa., in 1842, and as a young man was engaged with his father in the operation of a blast furnace at that place. He served with distinction through the civil war and was discharged with the rank of major. Returning to Columbia, he entered the hardware business and in 1882 sold out to accept the position of general manager of the Keeley Stove Works at Royersford, Pa. He was later appointed superintendent of the Abram Cox Stove Co., Philadelphia, subsequently being elected treasurer and director. He retired from this concern in 1905 and organized the Model Co., Philadelphia, which took over the boiler business of the Cox Stove Co., and was president of this concern as well as the Reading Radiator Co., at the time of his death.



W. H. PFAHLER.

Mr. Pfahler was one of the first members of the National Civic Federation and throughout his business career was active in the adjustment of labor differences between employers and their employes. He also took a deep interest in the Winona Technical Institute, Indianapolis, and was active in reform and public spirited movements in Philadelphia. But it was as an active spirit in the organization of the National Founders' Association, of which he was the first president, and his identity with the National Metal Trades Association, that Mr. Pfahler was best known. Because of his breadth of vision, his farsightedness, his thorough appreciation of the growing tendencies of the times, his knowledge of human nature and his firm belief in the necessity of organization among employers as the only remedy for the constantly increasing number of difficulties ever arising between employers and employes, Mr. Pfahler was most broadly recognized.

The American Foundrymen's Association was organized in Philadelphia, on May 12, 1896, and shortly thereafter Mr. Pfahler was approached by the secretary of that organization who had become interested in some suggestions which were made, looking to the formation of an employers' organization, constituted for the sole purpose of discussing matters connected with the relations of employers to their employes, and vice-versa, and for the further purpose of endeavoring to arrange, if possible, amicable adjustments where disturbances seemed imminent.

It was suggested that it might be well to have a committee appointed to give this matter consideration. Francis Schumann, then president of the association, appointed the committee, consisting of Mr. Pfahler, who acted as chairman, Wm. Yagle, of Pittsburg, and E. H. Putnam, of Chattanooga, Tenn. This committee met, during that year, in Detroit, where the matter was tentatively talked over and, later on, it made a report at the annual meeting of the American Foundrymen's Association meeting held in Detroit, in May, 1897, which contained the following suggestions:

The object of the association should be the mutual protection of its members and the adjustment of all disputes with employes, with due consideration for the just interests of both parties to the controversy.

The membership should be confined to principals in and operators of foundries where castings in iron, steel, brass or other metals are made.

The working force of the association should be vested in an executive committee selected from the general membership, and in a district committee in each five or six districts into which the country should be so geographically divided as to bring together those foundrymen in whose territory similar customs and conditions prevail.

Each member should contribute to the fund of the association a proportionate part of such sum as may be necessary to defray the working expense.

An emergency fund should be created by special assessments on the members, in proportion to the number of molders employed by each at the time such assessment was levied. This fund should be held intact, for the double purpose of having on hand, at all times, ample funds to meet any demand upon the association, and to create an added attraction, making membership more valuable as the fund increased.

Every member should be free to settle on his own responsibility any dispute arising in his shop, but, having once invoked the aid of the association, he should place the entire settlement in its hands and be required to abide by the decision reached.

In case of dispute, every reasonable effort to settle it without a strike should be made, and if the employes refused to consent and did strike, all the force of the association should be brought to bear to give assistance to the member whose shop was affected, either by procuring men to take the places of the strikers, or by compensating the member for losses incurred in defending the principles at stake.

As indicating, more than anything else, the intentions of those who were active in the work at that time, it may be mentioned that, when this subject was up for consideration, it was regarded of such importance that invitations were extended to Henry Cribben, for many years at the head of the Stove Founders' Defense Association and at that time its president, and the late Martin Fox, president of the Iron Molders' Union, requesting them both to attend that meeting and express themselves, from their different viewpoints, with reference to the desirability and possibility of employers' and employes' associations working together.

As a result of this meeting, a committee of seven was appointed to canvass the sentiment of the foundrymen regarding the organization of a defense association. This committee con-

sisted of W. H. Pfahler, Philadelphia; Wm. Yagle, Pittsburg; E. H. Putnam, Chattanooga; H. M. Leland, Detroit; Edward Maher, Newark, N. J.; Alex. Jarecki, Erie, Pa.; and J. F. Lanigan, Lawrence, Mass.

From that time, Mr. Pfahler, with one or two others, addressed many meetings in Chicago, Cleveland, Pittsburg, Philadelphia and New York, for the purpose of interesting employers and having them regard favorably the project of forming an association. As an outcome of that work, a meeting was finally held in New York, Jan. 26, 1898, attended by 12 or 15 foundrymen, largely from eastern points, who agreed to second the efforts of those who, with Mr. Pfahler, had been working for some months along these lines. A tentative association was formed with Mr. Pfahler as president, and a constitution and by-laws were informally adopted, with the understanding that a more formal gathering should be held later, at which time the work of the preliminary meeting should be ratified. The next meeting was held in Cincinnati, in June, 1898, and Mr. Pfahler, president, was succeeded by P. W. Gates, of the Gates Iron Works, Chicago. Mr. Pfahler's services to the cause did not, however, cease there. He was elected a member of the first administrative council and has been an honorary member of this body since February, 1899. He was active in the counsels of the National Founders' Association and his advice was always eagerly sought and invariably taken upon important questions under consideration. He was a prominent factor in the formation of the National Metal Trades Association where likewise his counsel was regarded as of the utmost value. Mr. Pfahler served on the administrative council of this association, as an honorary member, from the time of its organization.

In 1905 his health began to fail and since then he spent considerable time in Europe enjoying a well-deserved rest.

He was possessed of a most affable and charming manner, strong personality, excellent judgment and a mind that derived its chief delight from the discussion of sociological problems. He had an extremely wide circle of devoted friends and admirers in every section and every state of the Union.

The Pittsburg office of Walter-Wallingford & Co., pig iron and coke, has been moved from the Farmers' National Bank building to 601 Peoples Bank building, Fourth and Wood streets.

AMERICAN INSTITUTE

Of Iron and Steel Men Will Resemble British Institute.

(Special Telegram.)

New York, April 1.—Through the filing of incorporation papers at Albany, announcement has been made of the organization of the American Iron and Steel Institute. Officers have been chosen as follows: President, Elbert H. Gary; first vice president, Powell Stackhouse; second vice president, Chas. M. Schwab; third vice president, Willis L. King; secretary, W. J. Filbert; treasurer, Edward Bailey. In addition to these, the directory board includes W. E. Corey, J. C. Maben, E. A. S. Clark, John A. Topping, E. C. Felton, W. A. Rogers, J. F. Welborn, T. J. Drummond and Samuel Mather.

The principal office will probably be located in New York, the purpose of the institute according to the incorporation papers being to afford means of communication between members of the iron and steel trades. It is known, however, that the intention of the organizers is to make the institution assume a similar position in this country to that held by the Iron and Steel Institute of England and that all phases of the industry, commercial, economic and scientific, will be dealt with. Its membership will be made up of all prominently identified with the trade in the United States and Canada.

The organization of the institute comes as the result of a long existing feeling among iron and steel manufacturers that there should be some central body to represent them properly and by crystallizing sentiment and presenting a united front to exert an influence calculated to further the progress of the industry in this country. The formal organization is accordingly the outcome of a gradual growth of sentiment rather than of any recently started movement. Details of the institute plans are not yet worked out.

Lake Superior Corporation. — The Lake Superior Corporation has made the following statement of the earnings of subsidiary companies for the six months ending Dec. 31, 1907:

Gross earnings		$5,393,601
Expenses		4,559,412
Net earnings		$ 834,189
Interest on loans	$ 93,123	
Interest Lake Sup. 1st mort. bds.	214,000	
		$ 307,123
Balance		$ 527,066

The balance, $527,066, compares with $29,030 for the fiscal year ended June 30 last, and $556,880 for the entire year preceding. The full 5 per cent dividend on the $3,000,000 income bonds, payable Oct. 1, calls for $150,000 annually. The floating debt is now $500,000 less than a year ago. The annual meeting, which has been adjourned from time to time because of injunction proceedings involving the vote on 50,174 shares of stock held as collateral, has been called for April 6.

STRUCTURAL STEEL.

Ordered by Corn Products Co.—Other Western Business.

Chicago, April 1.—The Corn Products Mfg. Co. placed the contract today with the Inland Steel Co. for 1,600 tons of steel reinforcing bars for its new project.

At noon today, bids will be opened on 3,500 tons or more of structural steel and 600 tons or more of castings for the same company. The Chicago, Burlington & Quincy R. R. placed today the order for 900 tons of structurals for Chicago track elevation work with the American Bridge Co. and Milliken Bros. took the contract for the Central Colorado Transmission Co., steel towers requiring 700 tons. The Great Northern railway has ordered a considerable tonnage of tie-plates through the Railroad Supply Co. The patentee, it is understood, will place the manufacturing order with the Illinois Steel Co.

The prices of steel bars in this market from outside mills are very weak. The sale of 2,000 tons yesterday is reported at less than 1.35c. Prices on standard spikes are now 1.80c. base, with a spread of 1.90c on small lots. Small railroad spikes are quoted 1.90c base, f. o. b. Pittsburg. Track bolts with square nuts are quoted 2.30c. to 2.40c. There has been absolutely no change in the price of wire rods.

Receivership Terminated.—The receivership of the Westinghouse Machine Co., which was created last October, was ended March 31 by Judge Young, of the federal court at Pittsburg. The property was turned back to the stockholders, and the company will begin its fiscal year without debt, with cash in bank and with orders in sufficient volume to operate its plant at about 75 per cent capacity, as it has been running.

Negotiations looking to a reorganization of the New York State Steel Co., Buffalo, N. Y., are being carried on between the receivers, stockholders and creditors. No definite conclusion has yet been reached.

OBITUARIES.

J. Wylie Smith, traveling salesman for the Taylor & Boggs Foundry Co., Cleveland, was found dead in a Pittsburg hotel, March 26. He was 61 years old.

James Henry Long died March 24 at Chicago. He was born in Chicago 64 years ago, the son of James Long, who managed the first system of water works of that city. The deceased had been engaged for many years in the steel manufacturing and brokerage business.

James M. Barker, one of the earliest civil engineers and architects of Wisconsin, died at his home at Merrill, Wis., March 22. He built several of the oldest manufacturing plants in the Fox river valley, and was identified with much dam and factory construction along the Fox river.

Ferdinand Philips, president of the Philips Pressed Steel Pulley Co., Philadelphia, died March 26, at his residence in that city. He was born in Germany in 1850, coming to this country when a young man, and was for a time engaged in wire rail manufacture at Philadelphia. He was a well known mechanical engineer and inventor.

John Eastwood, aged 89 years, president of the Eastwood Wire & Cable Co., Belleville, N. J., died March 23, at St. Augustine, Fla. He was born in England in 1843, and began in Belleville the manufacture of chemicals used in setting colors in silk. The plant was destroyed in 1860, and in 1864 he went into the wire weaving business. The Eastwood company is one of the largest of its kind in the country.

John A. Brill, one of the founders of the Brill Car Works, died March 25, at his home in Philadelphia. He had been in ill health for several years. With his brothers, G. Martin and Edward Brill, he aided in establishing the car works, the control of which passed into hands of the sons after the death of their father, John G. Brill, in 1888. He was vice president of the J. G. Brill Co., and was about 60 years old.

Hamilton Craig, a pioneer in the brass foundry industry of Pittsburg, died March 26 at his home in that city, at the age of 80 years. He early entered into the manufacturing business, and became a senior member of the firm of Craig Bros., brass founders. On the consolidation of the firm with the Bailey-Farrel Mfg. Co., in 1883, Mr. Craig retired from the business. Until he gave up business activities, about 12 years ago, Mr. Craig was connected with the engineering department of Allegheny county.

James E. Barrett, of the firm of Barrett & Daly, Jackson, Mich., contractors in ornamental sheet and copper, died March 9, aged 57 years. Had he survived until next October the firm would have been in existence 30 years. Mr. Barrett was the son of James Barrett and was born near Michigan Center, Mich. At the age of 20 years he entered a tinner's apprenticeship and seven years later with a fellow workman, John Daly, founded the firm which has become known throughout the country because of the large contracts which it has handled.

PERSONAL.

Lewis N. Lukens, heretofore vice president of the Longmead Iron Co., Conshohocken, Pa., has been made president and treasurer of the company to succeed Jawood Lukens.

S. G. Lockwood, general manager of the American Steel & Wire Co., Norwalk, O., has resigned. The directors elected as his successor H. E. Frazier, for a long time connected with Rogers, Brown & Co., who will assume his new duties April 1.

Henry L. Jones, of Sydney, Australia; G. E. Yeatman, of Johannesburg, Transvaal, and W. H. Oldhoff, of Batavia, Dutch East Indies, representatives in the places named of the United States Steel Products Export Co., have been making a tour of the plants owned by the United States Steel Corporation, to acquaint themselves with the products of the company.

Alexander E. Brown, vice president and general manager of the Brown Hoisting Machinery Co., Cleveland, was stricken by paralysis March 27. The attack was brought on by overtaxing his physical strength, his attending physicians say. His condition has improved, however, and strong hopes of his ultimate recovery are entertained.

Geo. K. Hamfeldt, formerly general manager of the Midland Steel Co., Pittsburg, arrived in New York March 28 on the Mauretania, from an extended trip in Europe. Mr. Hamfeldt expects to shortly sail for the continent again having accepted an engagement with Messrs. de Wendel & Cie, Germany.

Judge E. H. Gary, chairman of the United States Steel Corporation, has been selected at a meeting of the board of governors of the Automobile Club of America for the office of president on the ticket to be placed in nomination at the annual election of officers, April 14. Judge Gary will succeed as president of the club Colgate Hoyt, who declined renomination.

NEW BUILDINGS

In Philadelphia Will be Fireproof—Old Ones in Good Condition.

Philadelphia, March 30.—Careful investigation of the public schools of Philadelphia since the Collinwood disaster has brought out the fact that there are no such buildings over two stories in height which are not well protected by either fire escapes or fire towers, or both. While some minor defects have been discovered, there is no work of this character in sight that promises any large consumption of steel. The city, however, proposes to spend a large amount of money on new school buildings, which are to be made fireproof and in which a large amount of steel will be required for girders and other purposes. There is an item of $2,500,000 for new schools in a loan which is to be floated without delay, and about $500,000 has also been set aside for repairs to schools. As this work will be scattered along over a year or two, it is impossible to make any estimate as to the amount of structural material that will be required or its cost, but it seems safe to say that it will run into the hundreds of thousands of dollars.

REGULARS WON.

At the annual election of officers of the New York Metal Exchange, March 30, the full regular ticket was victorious by a vote of 73 to 43. The defeat of the "opposition" ticket, headed by James E. Pope, of the Pope Metal Co., means the turning down of the proposed plan of making the exchange the place of regular sales of metals, as on the Cotton and Coffee Exchanges. It is intimated, however, that at the meeting of the board of managers Thursday some modifications in the present methods of quoting copper prices will be adopted. The ticket elected was as follows: President, P. R. Jennings; vice president, Morton B. Smith; treasurer, Robert L. Crooke; secretary, C. Mayer; members of the board of managers, R. Hochschild, H. W. Hendricks, L. Vogelstein, G. E. Behr, Paul Koning, George W. Jaques, Emil Baerwald, A. B. Hall; arbitration committee, J. Langeloth, E. A. Caswell, Edwin Groves, E. J. Keane, Humphrey D. Bond.

STRIVING FOR THE ELEVATION OF WORKINGMEN

CONVENTION OF THE NATIONAL METAL TRADES ASSOCIATION

Success of the Cincinnati University Idea in Trade Education—Many Strikes Combatted, Few Lost—Slight Decrease in Membership in Spite of Hard Times—Large Attendance and Very Harmonious Proceedings

The great question of technical education of a broader, more practical type, carrying with it the equally important matter of the general welfare of the workman and the improvement of his condition, was plainly the center of interest at the 10th annual meeting of the National Metal Trades Association, held at the Hotel Astor, New York City, March 25 and 26. The problem was discussed at length on the convention floor, both by those interested in its educational aspects and by those to whom its possibilities in bettering manufacturing methods appealed most strongly, and the earnest and sympathetic note throughout its consideration augurs well for its early solution in a satisfactory manner.

The officials of the association had only favorable reports to present. There has been a slight numerical loss in membership, but this was of such a kind that it was felt the organization had been strengthened thereby. The early part of the year was one of widespread labor disturbance and an unusual number of difficulties were presented, but these have been cleared away and at present the association is enjoying a period of quiet almost unprecedented in its history. The combatting of the many strikes was effected at a much lower proportionate cost than formerly, evidencing the growing strength of the organization and of its methods of operation.

There was entire harmony in the gathering of over 200 manufacturers. The work before the convention, thanks to the earlier meeting of the administrative council and the careful handling of details by the commissioner, was completed without delay and the affairs of the association were delegated for the ensuing year into the hands of members whose past activities are a guarantee of an earnest, conscientious and successful administration.

Wednesday Morning.

After an address of welcome by Alderman Patrick H. McGowan, acting mayor of New York, the following committees were appointed:

CONVENTION COMMITTEES.

NOMINATING—J. W. Gardner, Gardner Governor Co., Quincy, Ill.; W. D. Sayle, Cleveland Punch & Shear Works Co., Cleveland; M. H. Barker, American Tool & Machine Co., Boston.

AUDITING—F. C. Caldwell, H. W. Caldwell & Son Co., Chicago; J. W. Glover, Glover Machine Works, Marietta, Ga.; Frank E. Hoadley, Farrel Foundry & Machine Co., Ansonia, Conn.

WAYS AND MEANS—William Kehoe, Kehoe Iron Works, Savannah, Ga.; A. H. Bullard, Bullard Machine Tool Co., Bridgeport, Conn.; C. S. Bonsall, Buckeye Engine Co., Salem, O.; E. H. Hargrave, Hisey-Wolf Machine Co., Cincinnati; E. W. Heyl, Heyl & Patterson, Inc., Pittsburg.

WAGES AND HOURS—L. H. Kittredge, Peerless Motor Car Co., Cleveland; S. P. Egan, J. A. Fay & Egan, Cincinnati; George F. Steedman, Curtis & Co. Mfg. Co., St. Louis.

STRIKES AND LOCKOUTS—E. P. Robinson, Atlantic Works, East Boston, Mass.; A. L. Lovejoy, Simplex Faucet Co., Hyde Park, Mass.; C. H. Cowdrey, C. H. Cowdrey Machine Works, Fitchburg, Mass.; William S. Hollowell, Harrison Safety Boiler Works, Philadelphia.

F. K. COPELAND,
President.

CONVENTION—W. D. Sayle, Cleveland Punch & Shear Works Co., Cleveland; H. D. Sharpe, Brown & Sharpe Mfg. Co., Providence; Exile Burkitt, Jackson Engine Co., Jackson, Tenn.; F. S. North, Union Special Machine Co., Chicago; E. C. Page, Page-Storm Drop Forging Co., Springfield, Mass.

President Barker's Report.

In opening his report, President Barker said:

"I wish to congratulate the National Metal Trades Association on the steady growth of the last year. This may seem a strange expression to use, as in fact we have not as many members by 17 as we had one year ago. We have had to drop 118 names from the rolls and have added 101 names, but I consider we have been the gainer by the change; that is, the names we have added are all names of concerns which will be of great help and benefit to the association."

Permanent President.

After discussing the strikes of the year briefly, President Barker stated that he was convinced that the association should, as soon as possible, secure the services of a good, strong man, one who could devote his entire time to the business of the association, and be made a permanent president, or rather, elected for a term of years. "I, for one," he said, "should like to see such a man made president of the two sister associations, the National Metal Trades Association and the National Founders' Association, and then let him conduct the affairs of both associations, and have a separate organization otherwise for each. Think this matter over, gentlemen, and I know you will see the wisdom of the suggestion."

President Barker spoke in terms of high praise of the work of the executive committee and of Commissioner Wuest and paid a feeling tribute to the former commissioner, Wm. P. Eagan, who died June 26, 1907. He referred to the work of the joint committee appointed by the National Founders' Association and N. M. T. A., especially in labor legislation at Washington. The matter of the publication of the *Open Shop* and the National Founders' Association publication, the *Review*, was placed in the hands of this joint committee, which decided to consolidate the two under the name of the *Review*.

Membership.

Concerning membership, Mr. Barker Barger said:

"I think it will be to the best interests of the association that from now on we continue to work for new members and only take those firms or companies that we are quite sure will be of benefit to the association. I am afraid we have been a little lax in our methods in the past in such mat-

ters, and have taken in members when it would have been much better for the whole membership if they had never been admitted. I think the association can well afford to keep at least one good man doing nothing else but soliciting new members, and at the same time, each member and each secretary of our local branches should do all he possibly can to get good, desirable concerns to join our association, as we should have at least double the number of members we now have; and can have them if each will do his share of the work necessary to accomplish this end."

Commissioner Wuest's Report.

The principal points of the report of Commissioner Robt. Wuest were as follows:

During the past year, there were reported to your officers a greater number of strike cases than ever before, in like period, in the history of the association. In the early spring of 1907, it was rumored that it was the intention of the International Association of Machinists to call a great number of strikes, within a short time of each other, in a widely scattered territory, with a view of disrupting our organization. That this policy was carried out, is demonstrated by the fact that a total of 126 strike cases against our members were reported to this office. The total cost to the association this year of handling the 98 strikes, the defense of which was authorized by our administrative council, was $86,450.40, as against an expenditure of $83,270.43 for the handing of the 59 strikes, the defense of which was authorized by our administrative council last year. The expense of 15 strikes which were combatted by our association was defrayed by the companies affected, because their membership had been accepted on the probationary basis.

In only four instances did the affected members submit to the union demands during the combatting of the strikes by our association, and these four members were promptly dropped from the rolls. Thirteen of the total number of strike cases reported did not become active, largely because of the efforts of your association's officers, and their advice to the affected members, and also because of the moral effect of their membership with us. In other words, a total of 109 strikes was fought to a successful conclusion, a total of 13 strikes prevented and four succumbed to organized labor.

Helping the Association.

It would be of great advantage to the association, and of direct benefit to the members themselves, if they would make it a point to always keep in close touch with the labor conditions prevailing in their shops, and to immediately notify the national office of any labor disturbances impending, since, by so doing, many serious, expensive and annoying strikes might be averted. Another matter of great importance to our members who are unfortunate enough to become involved in a strike, is that experience has demonstrated that immediate success in overcoming a strike is dependent, to a very large extent, upon the shop management itself. In a shop where the foremen are loyal, resourceful and with initiative, it is an exceedingly easy matter for the National Metal Trades Association, with its resources and ramifications to break a strike in that shop in very much less time, and at a very considerably less cost, with infinitely less annoyance than in a shop where such conditions do not prevail.

Expenses of a Union.

It is interesting to note that, according to the last published financial statement of the treasurer of the International Association of Machinists, that association spent, for all purposes, $379,451.23 for the six months' period covered by June, 1907, to Nov. 30,

H. P. Eells,
First Vice President.

1907; as against $95,433.47 spent, for all purposes, by our association for the same period. According to the report referred to, the income of the International Association of Machinists, for the period mentioned was $245,958.65, as against our income of $121,318.54. The above comparison, in view of the International Association of Machinists being merely one of 12 national union labor organinzations with which we come in contact, makes our record a very remarkable one.

Organized Labor.

A meeting, composed of leading representatives of national organizations of metal trades labor unions, was held in Cincinnati during the month of February, 1908, with a view of uniting the different labor union organizations in the metal trades, by the creation of a new branch of the American Federation of Labor, which, it is said, will be known in the future as the Federation of Metal Trades Association. The plan, to a large extent, seems to be that of promoting, in a more concrete form, the former sympathetic strike idea. According to current newspaper reports, the president of the International Association of Machinists was elected to the temporary presidency of the new branch. This move was unquestionaby put forth to strengthen the position of the International Association of Machinists, and all other labor organizations whose members are employed by our members. This is evidenced by the fact that this new federation will consist of nearly all of the trades unions, the members of which come under the classification of our association. A further object of this move can hardly be other than an endeavor to so unite the different union organizations in the metal trades that they will be in position to threaten an employer with a general strike of all of the members of the metal trades unions employed in the shop in support of the demands of any one of such unions. In this connection, it is unfortunate that the strength of the majority of the labor organizations with which we come in contact is in railroad shops, the managers of which, to a very large extent, seem to favor the agreement method of dealing with their labor. In other words, if Wall street could be convinced that the open shop means increased peace and harmony to the employes, and increased dividends to the owners of railroad stock, much good would result.

Aims of the Association.

I believe that the time has come when it is desirable to have it become known that the National Metal Trades Association is not a purely fighting or even defensive organization, but that it stands

First—For all that is best for both employer and employe, by creating and maintaining the open shop.

Second—That it appreciates the wisdom of greater attention being given the subject of "Industrial Education."

Third—That it acknowedges the fact that it requires the combined efforts of all of its members, and all other thinking citizens, in the opposing of pernicious class legislation.

If our success in the combatting of the strikes which were called last year in the shops of our members, as a direct result of their refusal to accede to unjust demands and our success in the prevention of strikes which were threatened, and which would have occurred had it not been for the membership held in our organization and the three facts just enumerated could be called to the attention and impressed upon the minds of the manufacturers eligible to membership with us, our organization, instead of merely holding its own in point of membership, as was the case last year, would have a phenomenal growth.

I believe that it is almost superfluous to make mention of that truism — that "Manufacturers are seeing clearly, in the light of recent history, that the problems presented by labor organizations cannot be solved by single-handed effort."

Secretary Dingwall's Report.

Secretary Dingwall presented an elaborate report on all the strikes handled during the year. He gave the fol-

lowing statistics concerning membership:

Total members in good standing on March 1, 1908, 741; total members in good standing on March 1, 1907, 758; decrease, 17; per cent of decrease, 2¼.

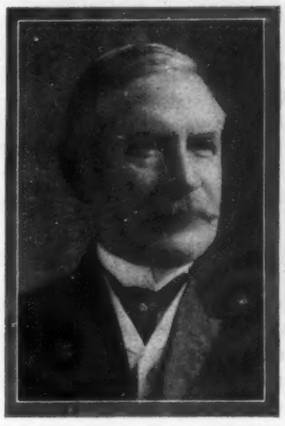
There are now local branch associations in Boston, Chicago, Cincinnati, Cleveland, Hartford, Indianapolis, New Haven, New York, Pittsburg, Providence, Springfield, Mass., St. Louis, Syracuse, Toledo, and Worcester, Mass.

Technical Education.

Practically all of the Wednesday afternoon session was devoted to the hearing of reports of standing committees, of which that on technical education proved the most fertile source of discussion. This report was presented by William Lodge, of the Lodge & Shipley Machine Tool Co., Cincinnati, and reviewed the action of the Boston convention, which provided for the organization of a machinists' school by the Winona Technical Institute, at Indianapolis, in consideration of National Metal Trades Association furnishing the necessary equipment and founding 30 scholarships of $100 each for at least four years. The committee appointed to carry out this project, said Mr. Lodge, had endeavored to secure the equipment and scholarships from individual contributions solicited among the members, with the idea of avoiding a draft on the treasury for these purposes, and had succeeded in raising about $4,100 in scholarships and a very satisfactory assortment of equipment. The list of contributors was read and mention made of the equipment yet required.

Mr. Lodge commented upon the fact that a trade school, not a technical school, is aimed at. He spoke of the tendency to limit the apprentice in the average machine shop to one machine and of the small opportunity the boy now has for obtaining a good, all-round knowledge of the trade. He emphasized the need of a school which could take the son of the shop workman, give the boy something of a general education, teach him a trade in a thorough manner and, to make the proposition sufficiently attractive for the right class, enable him to earn something while securing this education.

Good, well trained machinists, continued the speaker, are extremely scarce articles. This plan will provide them. It is popular, as the large number of applications evidence, and the course of instruction is so thorough as to give the boys a big advantage, even over those enjoying even the best shop apprenticeship training. That there is a demand for institutions giving opportunities of this kind is proven by an attendance of 1,400 in the Ohio Mechanics' Institute at Cincinnati, where most of the boys can go only at night. Mr. Lodge made an appeal for the subscription of $8,000 more in scholarships, adding that, once this amount is raised, it will be used over and over again under an arrangement whereby the boys pay back a part of the money advanced them, this repayment beginning five years from date of entrance. In closing, he cited the fact that in Germany 55 per cent of



WILLIAM LODGE,
Treasurer.

the school children graduate at a level of the high school, while in Chicago this is done by less than one-tenth of one per cent.

In the discussion ensuing, L. H. Kittredge, of the Peerless Motor Car Co., Cleveland, suggested the soliciting of contributions toward the scholarship fund from manufacturers outside the membership list. It developed, in answer to a question of D. M. Wright, of the Henry & Wright Mfg. Co., Hartford, that at present applicants for enrollment at Winona are chiefly from the neighboring districts. E. F. DuBrul, of the Miller, DuBrul & Peters Mfg. Co., Cincinnati, said this was the usual experience with institutions of learning, adding that excellent pattern makers had been turned out by a New York school of cabinet making and that the Winona project was only one of many in which manufacturers had taken charge of technical training.

On the proposition to appropriate from the association treasury, $3,000 a year for four years to carry on the Winona school, a lively debate developed. The motion was voted down, chiefly through the objection that this would impose a double burden upon those concerns which had already contributed and that projects of similar type in other sections of the country were deserving of like support. The contention was made that the association's constitution did not authorize the expenditure of money for such purposes, but this was overruled by the chair on the ground that such an appropriation was justified as an educational project calculated to assist the organization in time of trouble. Members from Worcester, Pittsburg and Syracuse, where local institutions of similar nature are either in existence or projected, urged that technical schools should be supported by those manufacturers interested in their immediate district. The argument was raised that the Winona school was needed as a model for similar institutions eleswhere, as at this school it is being demonstrated that practical workmen can be produced in less time than in the shops, but the decision of the association was against the appropriation. The discussion, however, proved of benefit to the project, inasmuch as it brought out several voluntary subscriptions for scholarships.

Constitutional Changes.

Early adjournment was taken at the afternoon session in order to allow the holding of a caucus at which objections to the proposed changes in the constitution were heard and the question was generally discussed. George F. Steedman, of the Curtis & Co. Mfg. Co., St. Louis, served as chairman of this gathering. As a result of this caucus, the convention the following morning adopted a resolution providing for the appointment of a committee to take the entire matter under consideration, gather information as to the members' views thereon and provide, through the council, for another vote on the changes recommended at some later date. It was announced that the first vote on the changes recommended was not sufficiently large either to pass or defeat them.

Protecting Patents Abroad.

Before adjournment Wednesday, however, the work of the joint committee appointed to confer on questions of common interest with a similar committee of the National Found-

ers' Association was endorsed. Action of vital importance to American manufacturers of machinery was also taken through the passage of the following resolution, introduced by Frank S. North, of the Union Special Machine Co., Chicago:

Whereas, the patents and designs act, 1907, of the parliament of Great Britain provides "that at any time not less than four years after the date of a patent and not less than one year from the passing of the act (i. e., from August 28, last) any person may apply to the comptroller for the revocation of the patent on the ground that the patented article or process is manufactured or carried on exclusively or mainly outside the United Kingdom."

And whereas, France and Germany have passed similar laws;

And whereas, such laws impose excessive burdens upon American manufacturers owning patents granted by these countries, in that they require unnecessary duplication of costly plants and equipment; deprive American workmen of employment which the operation of these laws transfers to foreign workmen; and generally cause a widespread loss to the mercantile, transportation and labor interests of the United States, and,

Whereas, the interchange and mutual respect of patent privileges among nations, in the past, is most praiseworthy and to be favored; therefore, be it

Resolved, that the president and congress of the United States be petitioned by this association to enact proper legislation to protect American manufacturers by imposing similar conditions upon those foreign persons or corporations to whom United States patents are issued; be it further

Resolved, that the attention of the president and congress be called to the benefits that might be derived through reciprocal agreements, with such countries, relating to patents, which would modify the restrictions to the mutual advantage of the citizens of the countries interested. And, be it further

Resolved, that a committee of three be appointed by the president of this association with power to act, to present this matter in the proper manner.

On this committee were appointed F. S. North, of the United Special Machine Co., Chicago; Henry B. Sharpe, of the Brown & Sharpe Mfg. Co., Providence, and F. H. Stillman, of the Watson-Stillman Co., New York.

Co-Operative Training.

Following the report of the auditing committee, which recommended certain minor changes in financial methods, and the transaction of other routine business, the Thursday morning session was given over to Prof. Herman Schneider, dean of the college of engineering at the University of Cincinnati, for a discussion of the plan of practical technical education recently adopted at that institution. A complete outline of this co-operative method of training engineers was given by Prof. Schneider in THE IRON TRADE REVIEW of Dec. 27, 1906.

The present day unfitness of universities for training engineering students in a practical manner, the speaker explained, was due to a too rigid adherence to old university precedents, going back to the monastery as the forerunner of the college. As evidence that this shortcoming is generally recognized by business men and that efforts are being made to provide better methods, he told of a recent conversation with an official of one of the country's largest manufacturing concerns, which is planning to employ an educational director with ample authority to work out the problem satisfactorily. Prof. Schneider stated that when, eight years ago, he took up this problem of engineering education, he found business men demanding four things of their technical men—knowledge of the science underlying production, intimate acquaintance with the attitude of labor, a practical idea of the work to be done and a sense of business in shop operations. He speedily made up his mind that of these only the first could be obtained in the university proper; that the shop must supply the other three requisites.

Out of this grew his plan to take the university to the shop, by providing for two shifts of students, these alternating week by week in the university and the manufacturing plant. A six-year course is provided and the student spends the summer period of four months in the shops. Thus, in the six years, he spends a total of 48 months in the midst of actual manufacting operations. For entrance a high school diploma or its equivalent is required and the boy must begin work in the shop on the first of July previous to the opening of the college year, the idea of this being to give him a thorough trying out. The popularity of the plan is evidenced by the fact that for the first year 75 boys applied, 45 enrolled and 28 survived the weeding-out process. For the second year 800 applications were received, 60 were put in the shops July 1 and 44 were entered in September. Already there are about 700 applications on hand for next year and it will doubtless be a case by July 1 of selecting 50 boys out of a list of 2,000.

The students are paid for shop work, the initial rate being about 10 cents per hour, with an average increase of 1 cent per hour per six months up to 21 cents. The trying out process is extremely rigid, a method frequently employed being to start the boys during the hot summer months wheeling sand in a foundry alongside Italian laborers. Later in the course they are placed in various departments of the machine shop, in the designing department and even in the sales office, the plan near the end of the six years being to alternate shop and university by six months' periods.

In the way of results accomplished, Prof. Schneider said it had been demonstrated repeatedly that the co-operative students could do more in the half of their six years devoted to college work than the regular engineering students in four years, that their grades average 20 per cent better than those of the regulars. As an instance he cited a chemistry test in which 90 per cent of the cop-operative students passed, against 67 per cent of the regular students. Under a plan known as the "reverse quiz," the students at the close of lecture periods are encouraged to ask questions arising out of their shop experience. As a result, the speaker added, two instructors have already resigned. The operation of the school has occasioned little opposition on the part of the labor organizations, in fact it has apparently won their sympathy and support.

The Manufacturer's Side.

Following the address of Prof. Schneider, the manufacturer's view of the Cincinnati plan was presented by Fred A. Geier, of that city. He told of the antipathy toward the plan when first proposed on the part of the men in the shop, particularly those in charge, and of their speedy reversal of opinion. In the case of his own concern, he said, the boys are working at a profit to the company, as they can accomplish as much or even more work than those who have been

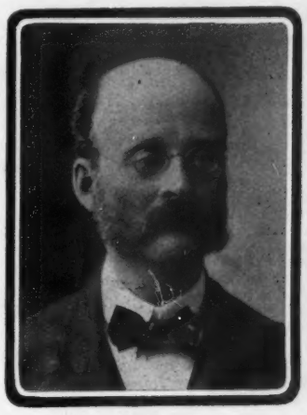
in the shops a much longer time. Of the six co-operative students now in his shops, four are from outside Cincinnati and applications for the course are coming in from all parts of the world.

Mr. Geier then made an impassioned appeal for greater attention to the improvement of educational opportunities for the great army of workmen in the shops, pointing out that this is as important a branch of manufacturing as the purchase of materials or the organization of the sales department. He deplored the common tendency to consider labor on the same plane with a piece of machinery that can be bought when needed, and told of finding the average of the 40 apprenticed machinists in his shop so deficient in the elements of an education as to be unable to translate fractions into decimals or read a blue print. In Cincinnati the boys leave school at an average age of 11, with only five years of instruction. This condition has resulted, in the case of his concern, in the hiring of a teacher to conduct night classes in which the boys are instructed along the more necessary lines with direct application to operations in the shop. He declared that the fostering of careful, painstaking, systematic and thorough habits, through improved education, is necessary to make up for shorter hours and higher wages. The efficiency of the workman must be raised, and his co-operation must be secured to keep down the cost of production.

This work, continued Mr. Geier, must be initiated by the manufacturer, first in the shop, later in the community and finally, perhaps, through national organizations. The Winona school was planned as a model for the country; the foundry school, in this direction, has been entirely commercialized and is turning out as good castings as can be made. It is declared that three months in this school is equivalent to a year of apprenticeship in the foundry.

Mr. Geier quoted official figures to show the remarkable increase in the sales of German-made machines in America and other countries and attributed this condition to the low illiteracy rate in that country, coupled with the practical nature of their educational methods. He spoke of the tremendous social problem involved, when the workman becomes merely an unthinking part of a machine, and of the need of improving the home and home influences in the interests of the workman of the future.

A vote of thanks was tendered Prof. Schneider and Mr. Geier by the association, and the former was congratulated upon his success in "Proving to an educator that it is idle to withdraw a boy from contact with active life for four years as a means of preparing him for this very activity later." Mr. DuBrul declared that, because of our failure to teach *applied* science, our universities are 30 years behind those of Germany. As evidencing the need of a mixture of more of the practical with the regular technical university training, he told of one manufacturing concern which refuses to employ a college



M. H. Barker,
Honorary Councillor.

bred engineer until he has been broken in by two years' connection with some other concern. The Cincinnati plan takes the boy just out of high school, keeps him in contact with the shop for six years, gives him a chance to earn something as he goes along and, on the authority of Dean Kent, of Syracuse, turns him out so well prepared that he is further advanced than the graduate of the average engineering college six years after graduation. Mr. Geier referred to the fact that Cincinnati graduates will make good teachers for similar schools in other centers. He told of the co-operative students, at his suggestion, selecting "Make Good" as their class motto and black and blue as their colors. Prof. Schneider, in answer to a query, said that manual training in the high school was a hindrance to the boy, because it fails to take into account the element of time.

Anthony B. Dunlap, attorney for the association, spoke briefly in submitting a paper on "Recent Legislation." Resolutions of appreciation for favors tendered the members during the convention were voted to the Hotel Astor management, the telegraph companies and the New York and New Jersey branch of the N. M. T. A. The presentation by J. Kirby Jr., of the committee on legislation report, covering in detail a number of measures now pending, cleared away all business before the association with the exception of the election of officers. The report of the nominating committee, presented by H. N. Covell, of the Lidgerwood Mfg. Co., Brooklyn, was enthusiastically adopted, as follows:

New Officers.

President, F. K. Copeland, president Sullivan Machinery Co., Chicago.

First vice president, Howard P. Eells, the Bucyrus Co., South Milwaukee, Wis.

Second Vice President, J. H. Schwacke, W. Sellers & Co., Inc., Philadelphia.

Treasurer, Wm. Lodge, Lodge & Shipley Machine Tool Co., Cincinnati.

Four new members were elected to the administrative council, to serve until 1910. These are the last four names in the following list showing the present make-up of the council, which includes also the executive officers of the association:

John R. Back, F. E. Reed & Co., Worcester, Mass.

P. B. Kendig, Seneca Falls Mfg. Co., Seneca Falls, N. Y.

C. Bermingham, Canadian Locomotive Co., Ltd., Kingston, Ont.

M. K. Bowman, Griscom-Spencer Co., New York.

H. W. Hoyt, Great Lakes Engineering Works, Detroit.

E. P. Robinson, Atlantic Works, Boston.

W. A. Layman, Wagner Electric Co., St. Louis.

George Mesta, Mesta Machine Co., Pittsburg.

W. H. Pfahler, Philadelphia. (Honorary.)

M. H. Barker, American Tool & Machine Co., Boston. (Honorary.)

The election of the retiring president, Mr. Barker, to honorary membership in the administrative council was in fitting recognition of his loyal service to the organization. He has been a member of the council since its origin and has never missed a meeting. He was repeatedly honored during the convention and as "Uncle Barker" was twice called upon to respond to resolutions of thanks. On taking the chair as his successor, Mr.

Copeland made an earnest appeal for loyalty and co-operation in times of peace, like the present, and emphasized the need of eternal vigilance. Mr. Eells spoke of the efforts of Mark Hanna toward bringing capital and labor into closer relationship, and William Lodge, "who keeps the treasury just the same," also responded briefly.

Mr. Wuest Reappointed.

At a meeting of the administrative council following the adjournment of the convention, Commissioner Robert Wuest and Secretary N. W. Dingwall, as well as other members of the present organization, were reappointed for the ensuing year and their successful work was commended. Council committees were named as follows:

Executive, Copeland, chairman, Eells, Kendig and Hoyt.

Technical education, Lodge, Pfahler and Covell.

Legislative, Schwacke, Bowman and Robinson.

Joint with N. F. A, Copeland, Barker and Hoyt, with Back and Layman as alternates.

Finance, Lodge, Eells and Mesta.

The Banquet.

The banquet, which was held Wednesday evening at the Astor, was thoroughly delightful from a standpoint of good fellowship and was especially noteworthy on account of the two able addresses, that of Prof. Henry S. Pritchett, president of the Carnegie Foundation for Advancement of Teaching and of the National Society for the Promotion of Industrial Education, which will appear in an early issue of THE IRON TRADE REVIEW, and that of Hon. Wm. H. Speer on "Some Dangerous Modern Tendencies," which is published elsewhere in this issue.

Those in Attendance.

M. H. Barker, president, American Tool & Machine Co., Boston.
F. K. Copeland, first vice president, Sullivan Machinery Co., Chicago.
O. B. Kinnard, second vice president, Kinnard-Haines Co., Minneapolis.
Wm. Lodge, treasurer, Lodge & Shipley Machine Tool Co., Cincinnati.
W. M. Taylor, Chandler & Taylor Co., Indianapolis.
J. H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia.
Howard P. Eells, Bucyrus Co., So. Milwaukee.
J. Kirby Jr., Dayton Mfg. Co., Dayton, O.
Jno. R. Back, F. E. Reed Co., Worcester, Mass.
P. B. Kendig, Seneca Falls Mfg. Co., Seneca Falls, N. Y.
C. Bermingham, Canadian Locomotive Co., Ltd., Kingston, Ont.
M. K. Bowman, Griscom-Spencer Co., New York City.
H. N. Covell, Lidgerwood Mfg. Co., Brooklyn.
W. D. Sayle, Cleveland Punch & Shear Works Co., Cleveland.
Robert Wuest, commissioner, National Metal Trades Association, Cincinnati.
N. W. Dingwall, secretary, National Metal Trades Association, Cincinnati.
E. Burkitt, Southern Engine & Boiler Works, Jackson, Tenn.
G. E. Mitchell, Alden Sampson Mfg. Co., Pittsfield, Mass.
S. D. W. Cleveland, National Metal Trades Association, Syracuse, N. Y.
S. A. Fortson, Lombard Iron Works, New York.
C. G. Ross, Lincoln Iron Works, Rutland, Vt.
H. F. Arnold, American Tool & Machine Co., Boston.
Charles Fosdick, Fitchburg Steam Engine Co., Fitchburg, Mass.
J. F. Hem, National Metal Trades Association, St. Louis.
Antonio C. Pessano, Great Lakes Engineering Co., Detroit.
E. C. Smith, Mossberg Wrench Co., Central Falls, R. I.
John G. Aldrich, New England Butt Co., Providence, R. I.
John Bath, Bath Grinder Co., Fitchburg, Mass.
Arthur W. Lovell, Blount & Lovell, Boston.
Geo. L. Markland Jr., Philadelphia Gear Works, Philadelphia.
H. M. Wilson, Taylor-Wilson Mfg. Co., Pittsburg.
David N. Carlin, Thomas Carlin's Sons Co., Pittsburg.
Henry D. Sharpe, Brown & Sharpe Mfg. Co., Providence.
F. C. Caldwell, H. W. Caldwell & Son Co., Chicago.
Frank B. Caldwell, H. W. Caldwell & Son Co., Chicago.
J. H. Long, J. H. Long Mch. Co., Boston.
A. E. Newton, Prentice Bros. Co., Worcester, Mass.
Thomas McWilliams, Thomas McWilliams, New York City.
A. L. Lovejoy, Simplex Faucet Co., Hyde Park, Mass.
A. H. Bullard, Bullard Mch. Tool Co., Bridgeport, Conn.
F. A. Fisher, Cape Ann Anchor Works, Gloucester, Mass.
F. W. Schultz, *The Iron Age*, New York City.
A. M. Powell, Parker Wire Goods Co., Worcester, Mass.
L. J. Chandler Co., Springfield, Mass.
Chas. N. Pratt, Goodman Mfg. Co., Chicago.
Wm. S. Ralston, Chaplin-Fulton Mfg. Co., Pittsburg.
F. F. Squire, secretary Springfield branch, N. M. T. A., Springfield, Mass.
E. C. Page, Page-Storm Drop Forge Co., Springfield, Mass.
J. W. Glover, Glover Machine Works, Marietta, Ga.
W. A. Layman, Wagner Electric Mfg. Co., St. Louis.
James G. Merrick, Employers' Association, Toronto, Toronto, Can.
L. Moulthrop, New Haven Mfg. Co., New Haven, Conn.
Wm. Kehoe, Kehoe Iron Works, Savannah, Ga.
C. S. Bonsall, Buckeye Engine Co., Salem, O.
Duncan D. Russell, James Russell Boiler Co., Boston.
Alfred E. Cox, Atlantic Works, East Boston.
T. A. Jones, W. A. Jones Foundry & Machine Co., Chicago.
E. F. Braren, Weller Mfg. Co., Chicago.
R. B. Van Dyke, American Locomotive Auto. Co., Providence.
W. A. Evans, American Locomotive Auto. Co., Providence.
Don Tulloch, National Metal Trades Association, Worcester, Mass.
Geo. F. Lawley, Geo. Lawley & Son Corp., So. Boston.
Alex. Harvey, Detrick & Harvey Machine Co., Baltimore.
B. F. Crane, D. M. Nichols Iron Works, New York City.
D. A. Nichols, D. M. Nichols Iron Works, New York City.
G. H. Paswaters, manager New Haven branch, N. M. T. A., New Haven.
A. E. Rowland, Rowland Machine Co., New Haven.
R. H. Brown, R. H. Brown & Co., New Haven.
J. J. Satterthwait, Remington Machine Co., Wilmington, Del.
Frank Burgiss, Boston Gear Works, New York City.
F. Chillingworth, R. H. Brown & Co., New Haven.
Grant Sipp, Sipp Electric & Mach. Co., Paterson, N. J.
J. Wheaton Stone, Eastern Machinery Co., New Haven.
Daniel Simonds, Simonds Mfg. Co., Fitchburg, Mass.
F. B. Farnsworth, McLagon Foundry Co., Inc., New Haven.
H. B. Slate, Dwight Slate Machine Co., Hartford.
Albert A. Baker, Farrel Foundry & Mch. Co., Ansonia, Conn.
R. A. Robertson, Providence Engineering Wks., Providence.
E. F. Chamberlin, Scranton Forging Co., Scranton, Pa.
Frank E. Hoadley, Farrel Foundry & Mch. Co., Ansonia, Conn..
J. C. Hobart, Triumph Electric Co., Cincinnati.
N. DuBrul, Miller, DuBrul & Peters Mfg. Co., Cincinnati.
C. F. Cowdrey, C. H. Cowdrey Machine Wks., Fitchburg, Mass.
James Kindred, Boynton & Plummer, Worcester, Mass.
D. M. Wright, Henry & Wright Mfg. Co., Hartford.
Ferd Messmer Jr., Ferd Messmer Mfg. Co., St. Louis, Mo.
R. G. Henry, Henry & Wright Mfg. Co., Hartford.
Wm. H. Karges, Missouri Lamp & Mfg. Co., New York.
Chas. F. Gilbert, A. Gilbert & Sons Brass Foundry Co., St. Louis.
A. I. Jacobs, Jacobs Mfg. Co., Hartford.
A. H. Folger, Lockwood Mfg. Co., East Boston, Mass.
Geo. D. Kirkham, Harris Auto Press Co., Niles, O.
J. C. Gorton, Harris Auto Press Co., Niles, O.
James Le. Montgomery, Toledo Machine & Tool Co., Toledo, O.
Fred A. Geir, Cincinnati Milling Mch. Co., Cincinnati.
J. A. B. Patterson, Standard Gauge Steel Co., Beaver Falls, Pa.
Paul Blatchford, secretary Chicago branch, N. M. T. A., Chicago.
E. Kneeland, United Engineering & Foundry Co., Pittsburg.
F. H. Zimmers, Union Foundry & Machine Co., Pittsburg.
A. J. Thornbey, Narragansett Machine Co., Providence.
E. W. Heyl, Heyl & Patterson, Inc., Pittsburg.
John Becker, Becker-Brainard Milling Machine Co., Boston.
S. Moltrup, Standard Connecting Rod Co., Beaver Falls, Pa.
H. Ritter, Lunkenheimer Co., Cincinnati.
Wm. C. Warren, S. L. Allen & Co., Philadelphia.
Alfred J. Jupp, Lunkenheimer Co., Cincinnati.
E. E. Greenwald, 150 Nassau St., New York.
F. S. North, assistant treasurer, Union Special Machine Co., Chicago.
J. M. Manley, secretary Cincinnati branch, N. M. T. A., Cincinnati.
J. Frederick McClosky, Taft-Pierce Mfg. Co., Woonsocket, R. I.
E. F. DuBrul, Miller-DuBrul & Peters Mfg. Co., Cincinnati.
F. Chudoba, Miller, DuBrul & Peters Mfg. Co., Cincinnati.
Jno. D. Hibbard, president John Davis Co., Chicago.
C. L. Cummings, general manager Cummings Machine Co., New York.
Phil. Frankel, secretary Cleveland branch, N. M. T. A., Cleveland.
Robert Biddle, president John L. Gaumer Co., Philadelphia.
Si P. Egan, vice president and general manager J. A. Fay & Egan Co., Cincinnati.
E. H. Hargrave, Hisey-Wolf Machine Co., Cincinnati.
L. D. Weaning, Variety Iron Works, Cleveland.
S. D. W. Cleveland, secretary Syracuse branch, N. M. T. A., Syracuse, N. Y.
U. F. Washburn, Dayton Mfg. Co., Dayton, O.
H. C. Hunter, secretary New York branch, N. M. T. A., New York.
Irving H. Reynolds, William Tod Co., Youngstown, O.
Anthony B. Dunlap, attorney National Metal Trades Association, Cincinnati.
D. H. McPherson, secretary Manufacturers Association of Philadelphia, Philadelphia.
Prof. Schneider, University of Cincinnati, Cincinnati.
W. E. Shipley, Philadelphia.
H. D. Sayre, National Metal Trades Association, Cincinnati.
Hon. Wm. H. Speer, Jersey City, N. J.
William J. Davidson, Burlce Dry Dock Co., Port Richmond, N. Y.
Lewis Harris Kittredge, Peerless Motor Car Co., Cleveland.
Winslow Blanchard, Blanchard Machine Co., Cambridge, Mass.
M. A. Coolidge, Fitchburg Machine Works, Fitchburg, Mass.
M. Fogarty, Michael Fogarty, New York.
F. F. Hitchcock, Hitchcock Machine Tool Works, Chicago.
Wm. P. Collins, Collins Iron Works, New York.
J. Rodahan, Logan Iron Works, Brooklyn.
R. C. Payson, Portland Co., Portland, Me.
J. F. Williams, Garvin Machine Co., New York
Wm. S. Hallowell, Harrison Safety Boiler Works, Philadelphia.

BANQUET OF THE NATIONAL METAL TRADES ASSOCIATION AT THE HOTEL ASTOR, NEW YORK, MARCH, 25, 1908.

John A. Hill, *American Machinist*, New York.
A. C. Fischer, secretary Toledo branch, N. M. T. A., Toledo, O.
Robert Kaltenbach, Interstate Engineering Co., Cleveland.
George H. Tompkins, assistant secretary Chicago branch, N. M. T. A., Chicago.
Geo. F. Steedman, Curtis & Co. Mfg. Co., St. Louis.
F. R. Boocock, American Anti-Boycott Association, New York.
H. H. Latham, Latham Mch. Co., Chicago.
P. O. Geier, Cincinnati Milling Machine Co., Cincinnati.
O. C. Wiley, Standard Chemical & Oil Co., Troy, Ala.
Eugene Childs, Tremont Mfg. Co., Boston.
George Mesta, Mesta Machine Co., Pittsburg.
W. H. Carpenter, Rahn-Carpenter Co., Cincinnati.
Chas. E. Hildreth, Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.
Harris Tabor, Tabor Mfg. Co., Philadelphia.
Irving H. Page, J. Stevens Arms & Tool Co., Chicopee Falls, Mass.
Jos. A. Holland, secretary Rhode Island branch, N. M. T. A., Providence.
D. F. S. Clark, secretary Boston branch, N. M. T. A., Boston.
John Hahn Jr., Hahn-Carpenter Co., Cincinnati.
Julius Gilbert Day, Whitlock Printing Press Mfg. Co., Derby, Conn.
Fred B. Adam, Frank Adam Electric Co., St. Louis.
George Smart, THE IRON TRADE REVIEW, Cleveland.
F. W. Hutchings, secretary National Founders' Association, Detroit.
J. M. Taylor, National Founders' Association, New York.
W. L. Fay, Fay & Bowen Engine Co., Geneva, N. Y.
W. B. Monison, McIntosh, Seymour & Co., New York.
P. A. Ware, *Iron Age*, New York.
F. S. Halsey, *American Machinist*, New York.
Mason Britton, *American Machinist*, New York.
L. A. Bevin, Rider-Ericsson Engine Co., New York.
H. B. McDonald, Simonds Mfg. Co., Fitchburg, Mass.
Arthur D. Pecoy, special representative, N. M. T. A., Cincinnati.
Chas. A. Haney, Sloan & Chace Mfg. Co., Newark, N. J.
F. M. Cresson,, Geo. V. Cresson Co., Philadelphia.
J. Eastwood, Benjamin Eastwood Co., Paterson, N. J.
Arthur A. Fuller, Providence Engineering Wks., Providence.
H. W. Hoyt, Great Lakes Eng. Works, Detroit.
P. W. Gates, Hanna Engineering Works, Chicago.
Maurice E. Pollak, Block-Pollak Iron Co., Cincinnati.
H. M. Norris, Bickford Drill & Tool Co., Cinnati.
Henry L. Scott, Henry L. Scott & Co., Providence.
John McGhie, Hill Publishing Co., *American Machinist*, New York.
P. G. March, Cincinnati Shaper Co., Cincinnati.
C. Cunningham, Brooklyn.
C. P. Folsom, Dayton Globe Iron Works Co., Dayton, O.
George K. Garvin, Garvin Machine Co., New York.
J. M. Foote, Strieby & Foote Co., Newark, N. J.
B. S. Stephenson, THE IRON TRADE REVIEW, New York.
F. H. Stillman, Watson-Stillman Co., New York.
E. M. Woodward, Woodward & Powell Planer Co., Worcester, Mass.
Chas. G. Ross, Chas. Ross & Son Co., Brooklyn.
Charles H. Alvord, Hendey Machine Co., Torrington, Conn.
Jos. Enderlin, Jos. Enderlin Jr. & Co., Brooklyn.
J. T. Hadley, Jos. Reid Gas Engine Co., Oil City, Pa.
Fred F. Stockwell, Barbour-Stockwell Co., Cambridgeport, Mass.
George Langen, Cincinnati Planer Co., Cincinnati.
L. E. Harper, Grant Nail & Supply Co., Boston.
H. Roy Stacks, Geo. V. Cresson Co., Philadelphia.

Monthly Meeting of A. S. M. E.—The regular monthly meeting of the American Society of Mechanical Engineers will be held in the auditorium of the Engineering Society's building, New York, Tuesday, April 14. The subject for discussion is the conservation of natural resources, and the meeting will be addressed by four speakers, who will consider forest preservation in its relation to water power economy and utilization of fuel, and the attitude of engineers in regard to these. Dr. Henry S. Pritchett, president of the Carnegie foundation, will be one of the speakers, and will discuss "The Relation of the Engineer to the Body Politic." The subject of conservation of natural resources is now receiving unusual attention on account of the invitation of the president of the United States to the governors of the several states, and to the presidents of the national engineering societies to confer with him in Washington on this important problem.

Receiver for Tidewater Steel.—Howard H. Houston, Chester, Pa., has been appointed receiver for the Tidewater Steel Co. The company's plant has not been operated for several years with the exception of the furnaces run by the Pennsylvania Steel Co. The Tidewater company was organized by Philadelphia capitalists after the affairs of the Wellman Iron & Steel Co. were wound up, but did not meet with success. The total indebtedness is placed at $180,000. It is thought that recent court proceedings may tend toward an untangling of the company's affairs with a view to ultimate resumption of operation.

April Dividend Disbursements. — April dividend and interest disbursements throughout the United States will exceed $138,000,000, comparing with $140,000,000 in April, 1907. Industrial dividends to the amount of $25,437,920, and industrial interest payments aggregating $9,301,950 will be paid. The dividends fall $1,400,000 below those of April last year and the interest payments exceed by $600,000 those of the same period last year.

Union Works' Success.—Charles M. Schwab, chairman of the board of the Bethlehem Steel Co., announced in Washington a few days since that the business of the Union Iron Works, the San Francisco plant of the Bethlehem company, has been so unexpectedly successful during the past year that $600,000 will be expended in betterments there at once. Mr. Schwab is quoted as saying that the profits of the Union works far exceeded those of any eastern plant owned by the company.

FACTORIES RESUMING.

Indiana Companies Are Putting Men to Work—New Equipment Sought.

Indianapolis, March 30.—The De Witt-McIntyre Gear & Bending Co., Oakland City, has opened the bending department of its new plant and will soon have the whole factory in operation.

T. O. Ballard has been granted a franchise for electric light privileges at Franklin and is preparing to ask bids for the construction and equipment of a new plant.

Within a few days the new shops of the New York Central lines at Beech Grove, near this city, will open. It is stated that the big Brightwood shops will not be abandoned for at least one year. By April 10 it is believed several hundred men will be at work in the new shops.

W. H. Yule, superintendent of the Hartford City Lighting Co., Hartford City, states that his company is in the market for some new machinery and equipment.

The Butler Basket Co., Butler, whose plant was burned a few days ago, will be ready in a few days to receive bids for the construction and equipment of a new plant.

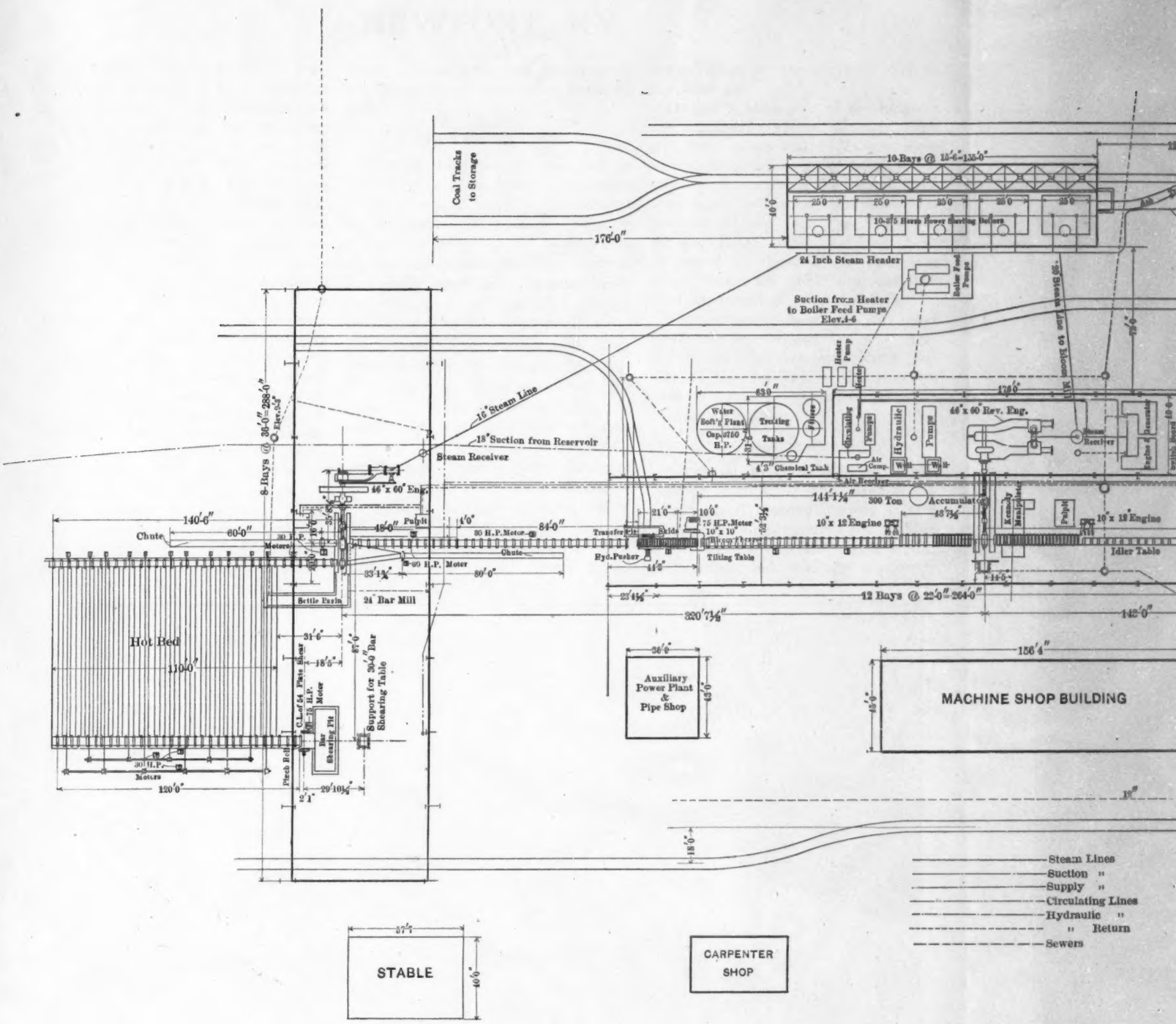
H. R. Gill and C. O. Grafton, directors, are having plans made for the construction and equipment of a factory for the recently organized Gill Clay Pot Co., Muncie, and will soon invite bids.

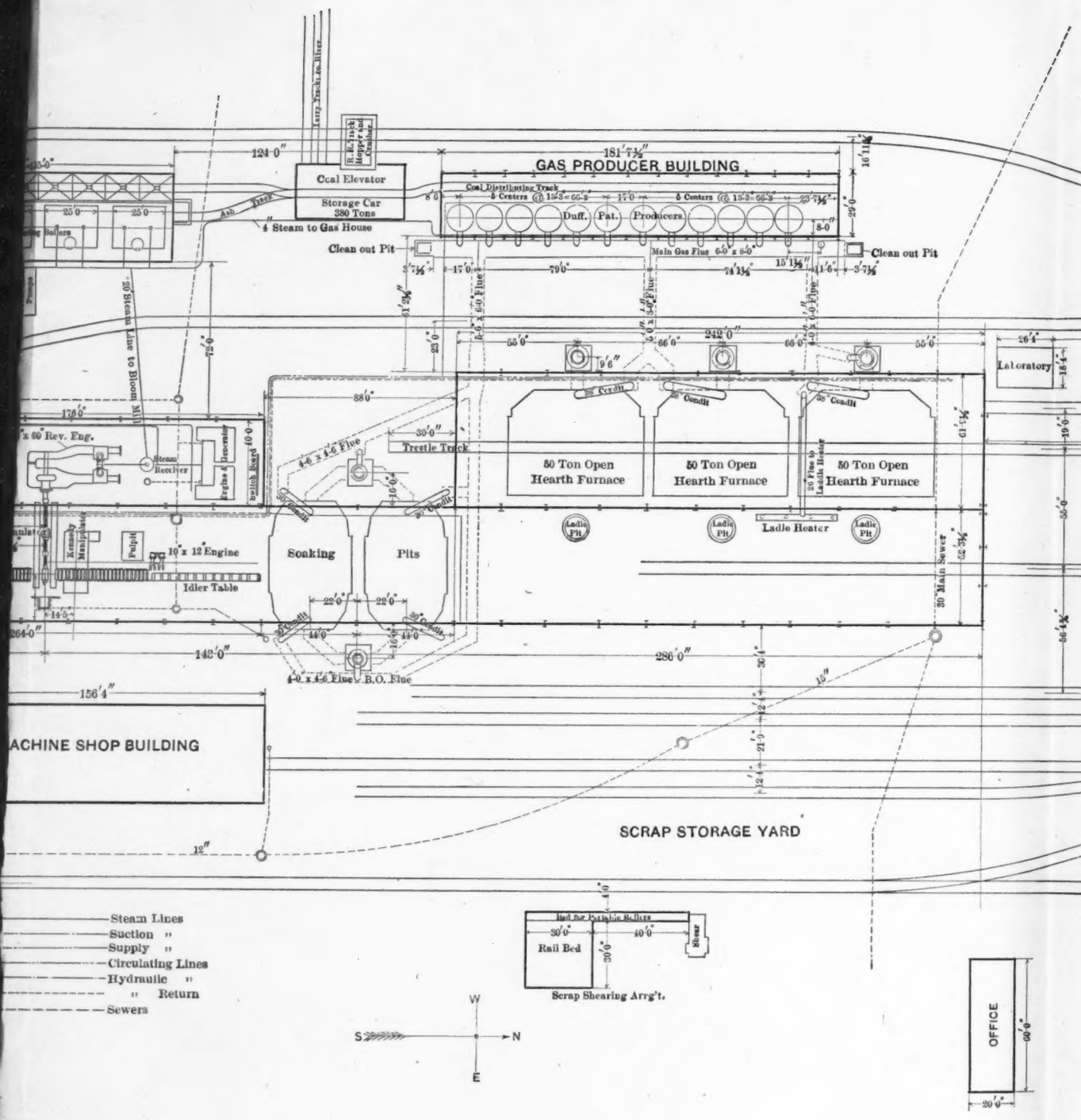
A permit has been issued to the Fisher Automobile Co., this city, to build a garage to cost $30,000, which will be the largest garage in the city. It is stated that the company will require some new mechanical equipment when it moves into the new garage.

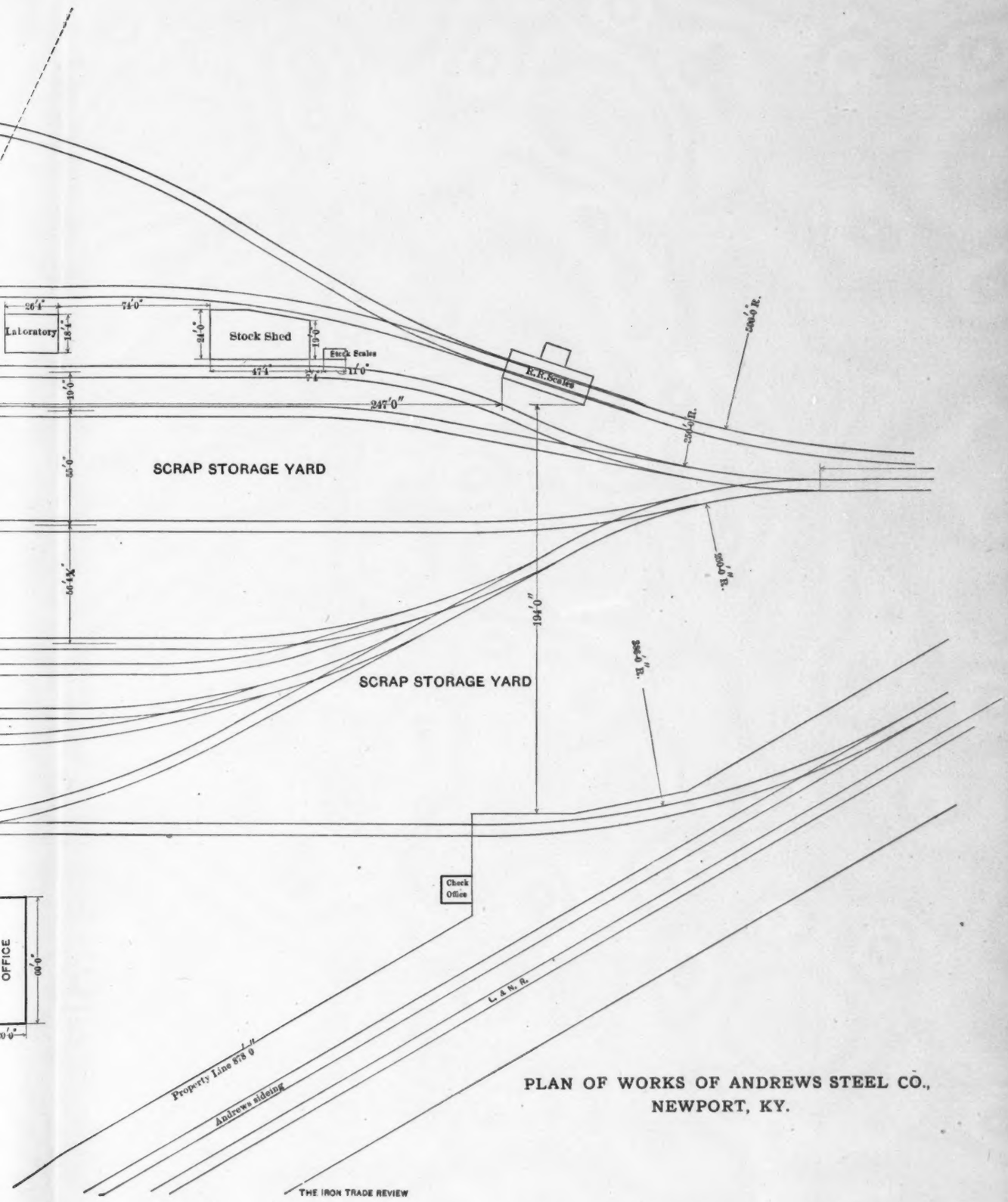
In the future manufacturing plants locating in this city will not be given bonuses or any special inducements. At a meeting last week the Commercial Club decided the city had outgrown such a practice and in the future efforts will be made to make the city so attractive that concerns will want to locate here.

Charles C. Erdman, superintendent of the Elwood plant of the American Sheet & Tinplate Co., has resigned.

The plan to reduce the preferred and common stock of the American Steel Foundries seems to be receiving steady approval from the stockholders, who are gradually depositing their holdings with the Guaranty Trust Co., New York City.


Coal Tracks to Storage
10-Bays @ 13'-6"=135'-0"
176'-0"
10'-0"
10-375 Horse Power Sterling Boilers
24 Inch Steam Header
Boiler Feed Pumps
Suction from Heater to Boiler Feed Pumps Elev.4-6
Heater
Pump
Heater
16" Steam Line
18" Suction from Reservoir
Steam Receiver
8-Bays @ 30'-0"=238'-0"
Elev.5-4
46"x 60" Eng.
140'-6"
60'-0"
Chute
30 H.P. Motors
48'-0"
Pulp
1'0"
30 H.P.Motor
84'-0"
Chute
50 H.P. Motor
80'-0"
33'1¾"
Settle Pans
24" Bar Mill
Hot Bed
110'0"
31'6"
18'6"
87'6"
C.I.or Cs. Plate shear
75 H.P. Motor
Support for 30-0" Bar Shearing Table
Bar Shearing Pit
Pinch Rolls
30 H.P. Motors
120'0"
2'1"
29'10½"
Water Soft'g Plant Cap. 3750 H.P.
Trucking Tanks
Pumps
Chemical Tank
Air Comp.
Hydraulic
Pumps
Air Receiver
46"x 60" Rev. Eng.
Steam Receiver
Engine
Pumps
Boiler Room
144'1¼"
300 Ton
Accumulator
21'0"
10'0"
75 H.P.Motor
10"x 10" Blower Tuyere
62'9½"
10"x 12" Engine
48'7¾"
Transfer Pit
Skids
Hydraulic Manipulator
Pulpit
10"x 12" Engine
Idler Table
Hyd.Pusher
Tilting Table
44'2"
14'0"
23'4½"
12 Bays @ 22'0"=264'0"
320'7½"
142'0"
36'0"
Auxiliary Power Plant & Pipe Shop
43'0"
156'4"
45'0"
MACHINE SHOP BUILDING
18'0"
Steam Lines
Suction "
Supply "
Circulating Lines
Hydraulic "
" Return
Sewers
37'7"
STABLE
40'0"
CARPENTER SHOP


GAS PRODUCER BUILDING
Coal Elevator
Storage Car
380 Tons
Coal Distributing Track
Duff.
Pat.
Producers
Clean out Pit
Main Gas Flue 6-0 x 8-0
4" Steam to Gas House
30" Steam Line to Bloom Mill
Trestle Track
50 Ton Open Hearth Furnace
50 Ton Open Hearth Furnace
50 Ton Open Hearth Furnace
Ladle Heater
Soaking Pits
10" x 12" Engine
Idler Table
Laboratory
30" Main Sewer
4-0 x 4-6 Flue
B.O. Flue
MACHINE SHOP BUILDING
SCRAP STORAGE YARD
Steam Lines
Suction "
Supply "
Circulating Lines
Hydraulic "
" Return
Sewers
Rail Bed
Scrap Shearing Arrg't.
OFFICE
W
S
N
E



PLAN OF WORKS OF ANDREWS STEEL CO., NEWPORT, KY.

THE PLANT OF THE ANDREWS STEEL CO., AT NEWPORT, KY.

The Andrews Steel Co. has just completed at Newport, Ky., a sheet bar and billet mill, together with the necessary steel plant for furnishing the raw material, which is one of the best arranged and most complete plants in the country. The Andrews Steel Co. is an outgrowth of the Newport Rolling Mill Co., operating sheet mills at Newport, Ky., and an arrangement has been effected whereby the latter concern will take a considerable percentage of the output of the new mill. It was incorporated in July, 1906, under the laws of the state of Kentucky. It acquired a site of about 30 acres, having a frontage of 2,000 feet on the Licking river on the west and an equal frontage on the Louisville & Nashville railroad on the east, a short distance outside of Newport. The property is 62 feet above Cincinnati high water.

All buildings in the new plant, which comprises open-hearth furnaces, a blooming mill, a billet and sheet bar mill and the other auxiliary machinery necessary for the operation of the plant are of heavy steel construction.

Open-Hearth Plant.

Steel is made for the new mill in a battery of three 60-ton open-hearth furnaces, whose location, in reference to the rest of the plant, is shown in the ground plan, on the insert. The portion of the main building, containing of the open-hearth furnaces, really forms a separate building, 115 x 242 feet, the floor of which is elevated above the general level of the mill floor about 4 feet. A Morgan high-type floor charging machine serves the furnaces, the tracks for it being laid outside of the tracks for the cars carrying the charging boxes. This latter track extends into the yard on the north end, an embankment rising from the yard level to that of the charging floor. Each furnace is served by a self-supporting steel stack, 125 feet high. There is no crane service on the charging side of the furnaces.

On the pouring side of the furnaces are installed a 15-ton, 6-girder Morgan ladle crane and a Morgan electric ingot stripper. As the elevation of the furnaces above the general floor level is not sufficient to permit of their pouring directly into the ladles set on the floor, ladle pits have been excavated at the rear of each furnace. These are brick lined and will each accommodate a 65-ton ladle.

The pouring tracks of the ingot mold cars extend past the pits. Opposite the furnaces and along one side of the building is the platform from whence the operations of pouring, etc., are controlled.

Soaking Pits.

To the south of the portion of the building containing the open-hearth furnaces and opening directly into it is the building containing the soaking pits, blooming mill and bloom shear, the engines and auxiliary machinery

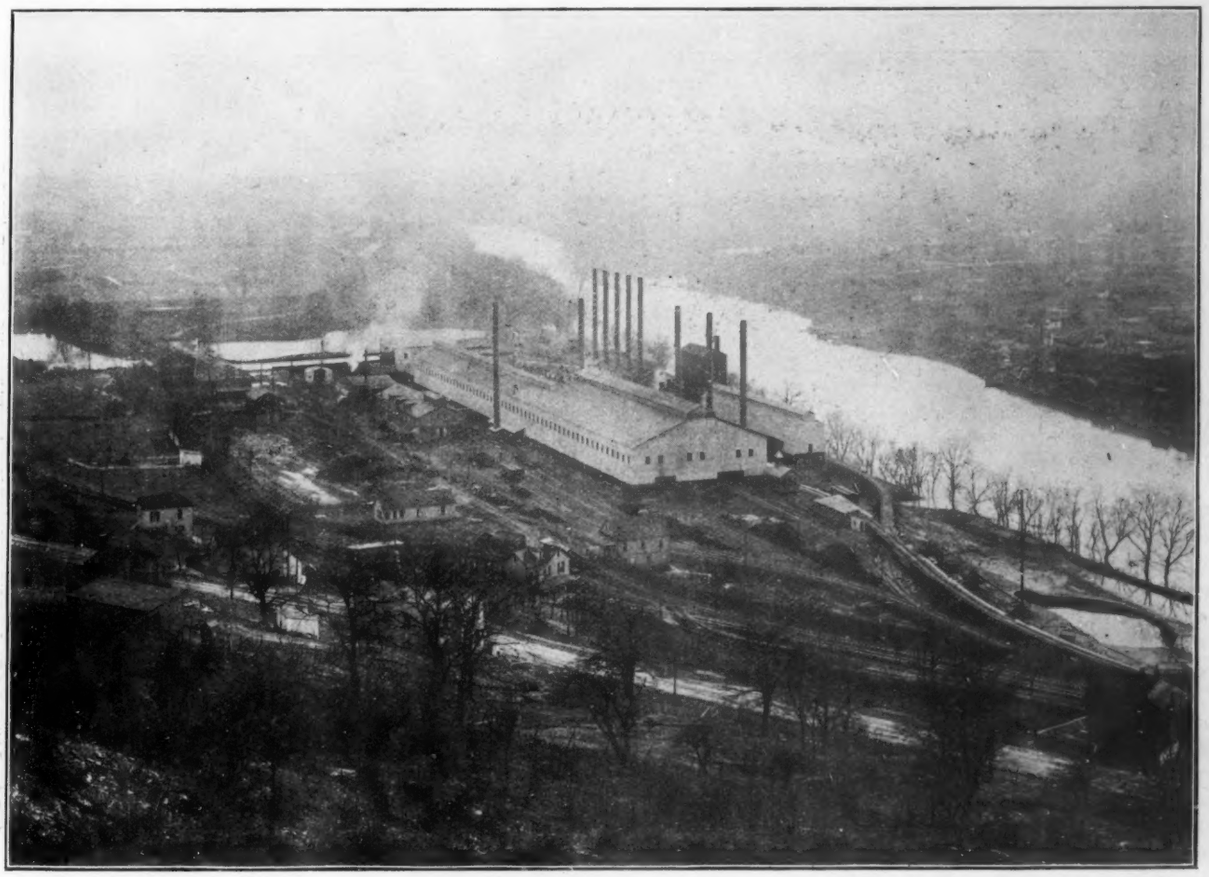


FIG. 1—BIRDSEYE VIEW OF ANDREWS STEEL PLANT, NEWPORT, KY.

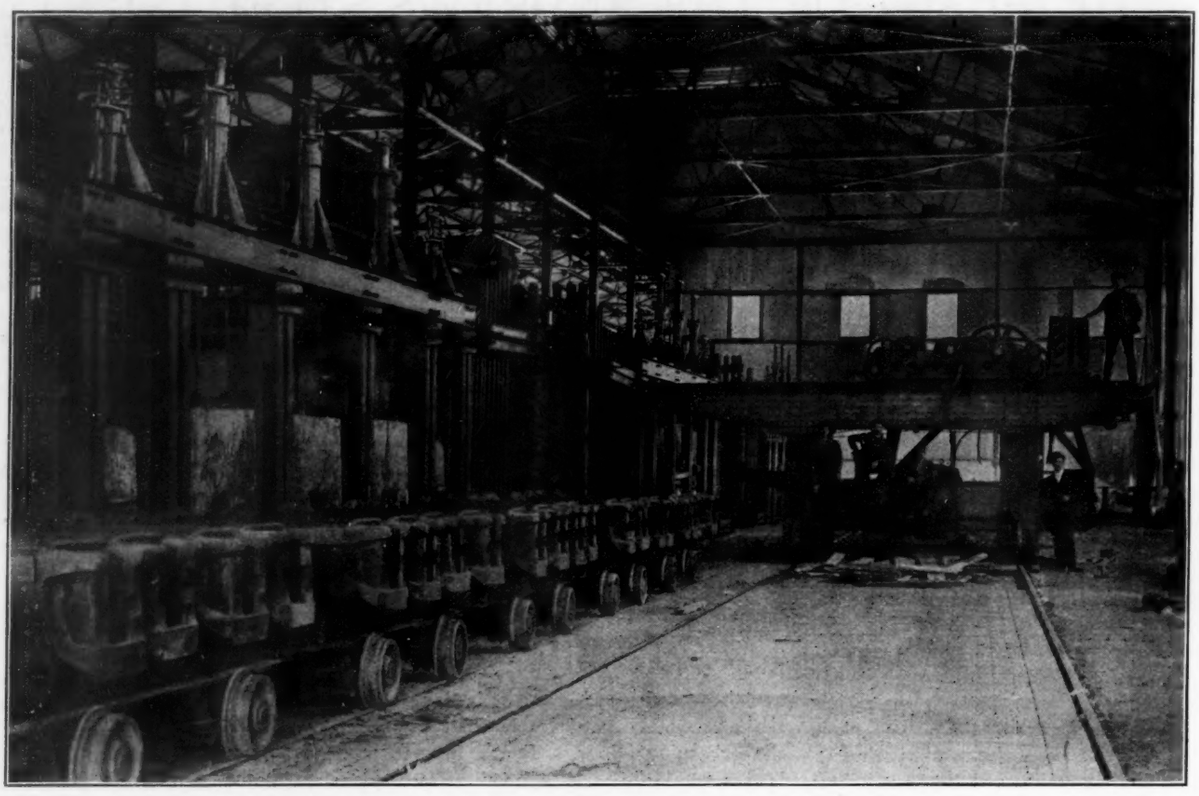


FIG. 2—CHARGING SIDE OF OPEN-HEARTH FURNACES. ANDREWS STEEL CO.

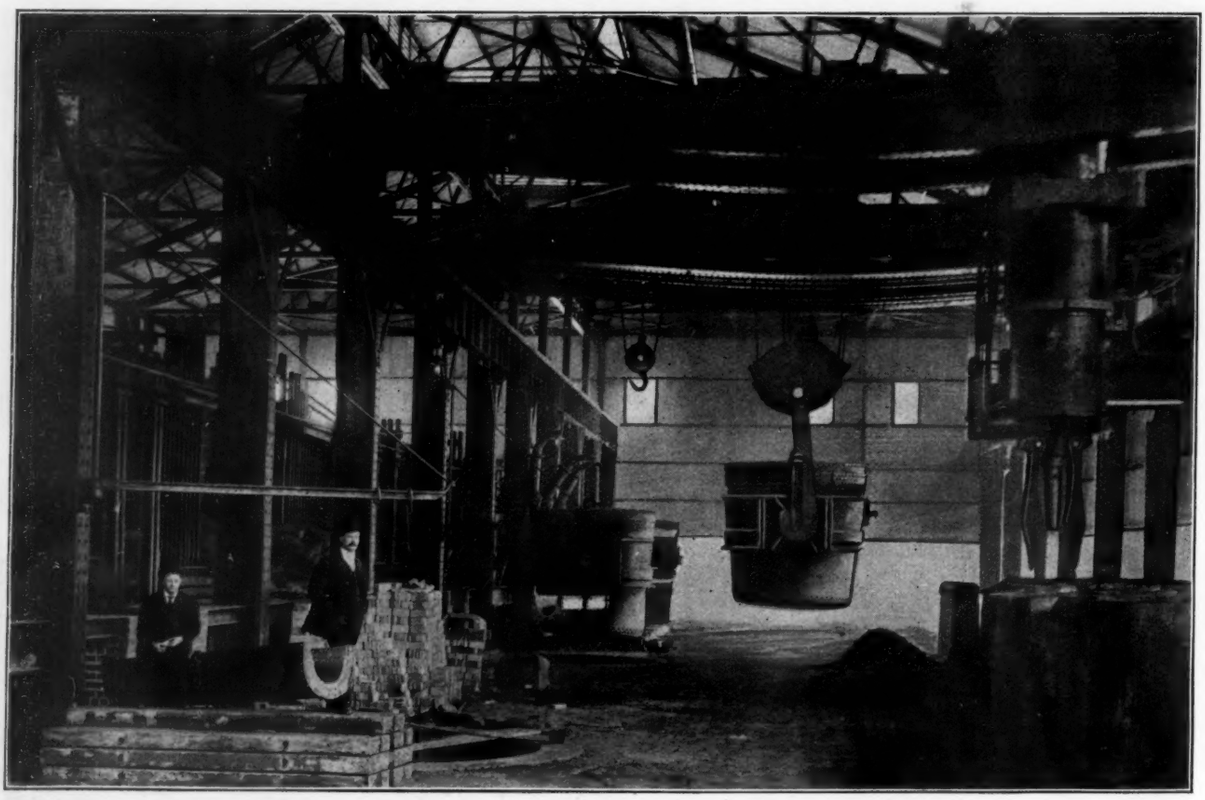


FIG. 3—POURING SIDE OF OPEN-HEARTH FURNACES. ANDREWS STEEL CO.

being installed in the lean-to attached to this portion. The soaking pits are commanded by a 20-ton crane with a 5-ton auxiliary hoist. After stripping, the ingots are conveyed to the soaking pits, of which there are two, each having four holes, with a capacity of eight ingots per hole. The pits are covered by means of hydraulically-operated sliding doors. Producer gas is used in them, which is obtained from a central producer plant described later, and which also furnishes fuel for the open-hearth furnaces. The soaking pits are controlled by Forter and Velte valves, and each discharges its waste gases to a self-supporting steel stack.

FIG. 4—SOAKING PITS, ANDREWS STEEL CO. BLOOMING MILL IN BACKGROUND.

Blooming Mill and Blooming Mill Engine.

Immediately to the south of the soaking pits is the entering table of the blooming mill. This table is driven by an Otis duplex engine and delivers the ingot to a 34-inch blooming mill, which is arranged to roll billets or suitable shapes for the sheet bar mill. The blooming mill was furnished by the United Engineering & Foundry Co., of Pittsburg, and is driven by a 46 x 60-inch double reversing engine built by the Mesta Machine Co., Pittsburg. The mill is equipped with an improved Kennedy manipulator. It is provided with electrically operated screw-downs driven by Westinghouse railway type motors. The manipulator consists of three cast steel fingers projecting up between the table rollers, mounted on a frame of I-beams which is moved back and forth across table by two single-acting hydraulic cylinders to shift the ingot from pass to pass, and raised and lowered through two bell cranks by one single-acting hydraulic cylinder to turn over the piece. The whole mechanism is mounted on a heavy cast iron base placed under the table.

Blooming Mill Engine.

The engine driving this mill is of unusually massive construction and develops at a speed of 70 revolutions per minute, 5,000 horsepower. The total weight of the engine is 800,000 pounds. The main bearings are 22 x 38 inches for the overhanging crank and there are two bearings for the center crank, each 22 x 36 inches. The main shaft is a hollow steel forging with a maximum diameter of 26½ inches with a 6-inch hole, and has mounted upon it a cast steel crank disc. The overhanging crank pin is 13 x 11 inches. The center crank pin is 22 x 14 inches, while the wrist pins are both 10 x 12 inches.

The peculiar features of this engine are found in the cylinder attachment, piston valve packing and reversing mechanism. The crank bearing and cylinder head is cast with the guide frame and a single set of bolts secures the head to the

cylinder and the cylinder to the frame. For the rear end of the cylinder, there is a sole plate support which also carries a tail rod guide, in order to allow for expansion. The cylinders are not bolted to the sole plate, but are fitted with slotted holes for the retaining bolts. The tongue and groove fit secures the alignment and permits end travel, due to temperature changes. The cross head and tail rod supports are made adjustable, allowing the piston to float. The pistons are of the umbrella type, and are carried on 12-inch hollow forged rods.

Fig. 7 shows the arrangement of the reversing mechanism used in connection with the valve gear link motion. It is mounted upon the engine frame between the cylinders and consists of a steam cylinder A, and an oil cylinder B and a continuous rod connecting it to the links of the valve motion through the balance levers D. Oil and steam control is by means of the four-way valves F and G, coupled together with a link. As shown, the valve gear is in mid position and the engine is receiving no steam. By moving the crank H in the desired direction, both oil and steam valves are opened and steam is admitted to one end of the cylinder, and the oil passage is opened, permitting the oil to flow from one end of the cylinder to the other. The pistons then begin to move and the valve linkage of the engines also. By the movement of the cross head I, the swinging lever J is brought into a new position by the link K, corresponding to the movement of the lever H, the position of which is set by the operator for a given cut off in the engine. By the movement of the lever J, the fulcrum L of the floating lever M is shifted to a new position, causing the lever M, by its connection to the control levers of the controlling valves, to restore these valves F and G to a neutral position. The oil passage between the two ends of the oil cylinder is thus closed, locking the engine valve motion in the desired position until the lever H is again shifted by the operator.

Bloom Shear.

The blooming mill delivers the rolled bloom to a run-out table also driven by an Otis duplex engine, which in turn delivers it to the shear table, at the end of which is a 10 x 10-inch bloom shear. Here the blooms are sheared to length and are either passed to the sheet bar mill or pushed off to one side to be shipped as billets. The illustrations, Figs. 6 and 8, show this shear, together with the skids and truck used when making billets. A hydraulically-operated pusher on the opposite side of the run-out table of the shear serves to push the billets off the table on to the skids. This feature is shown in Fig. 8. A draw back and tilting table forms part of the equipment of the shear,

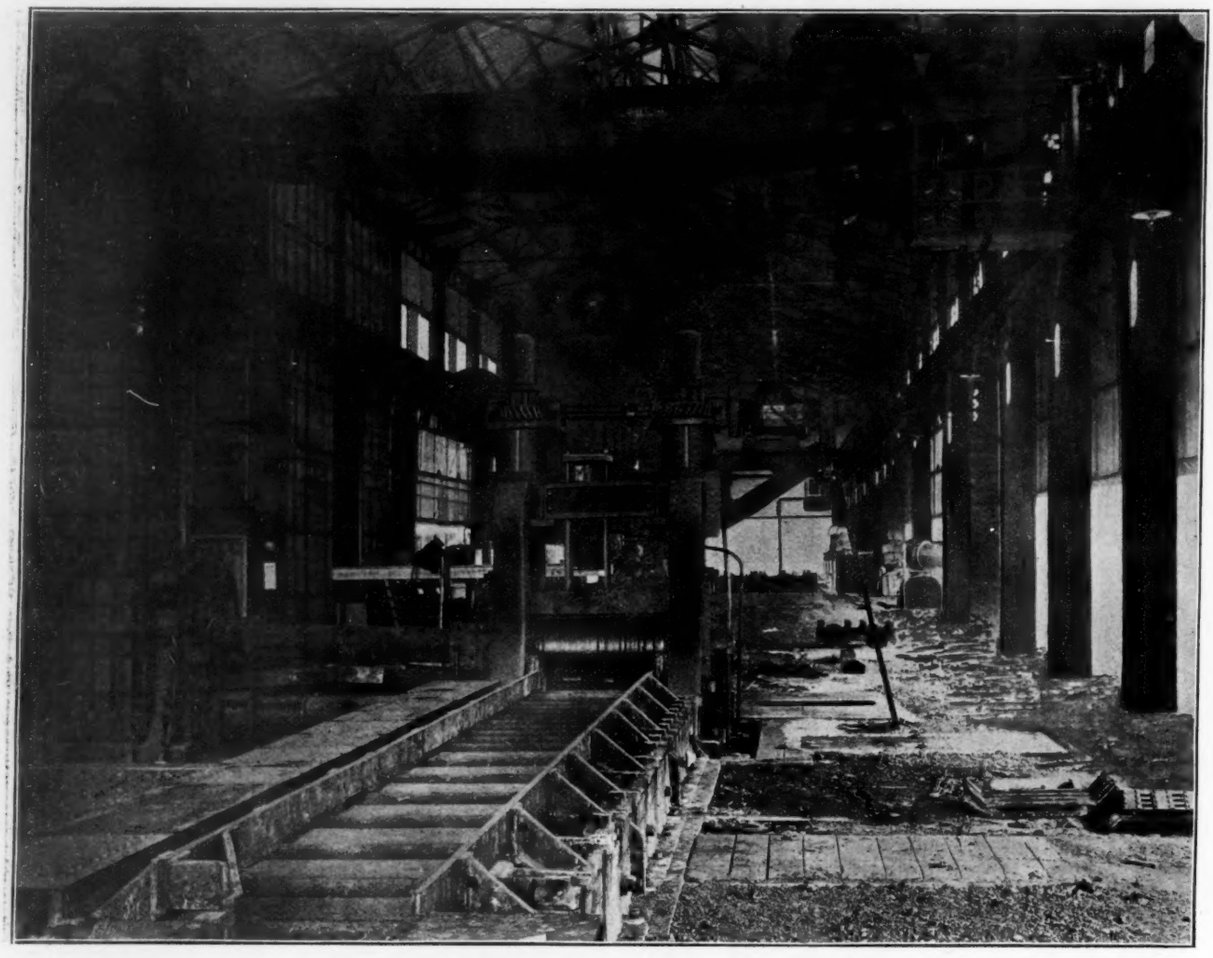


FIG. 5—BLOOMING MILL. ANDREWS STEEL CO.

enabling the crop ends to be easily disposed of and facilitating the handling of the sheared blooms. The shear itself is of the single pitman type, driven through compound reduction gearing by a 75-horsepower motor. A fly wheel 104 inches diameter, and is covered by patents. The mill itself consists of two stands of 24-inch rolls, the roughing stand being three-high, while the finishing stand is two-high. The rolls in the finishing stand are chilled. The piece receives five passes in the three-high mill and one direction of these pinch rollers is reversible, and when a piece leaves the mill, it is drawn back until it drops off the ledge shown near the center of the chute, after which the pinch rolls are reversed and carry the piece into the finishing rolls where the final

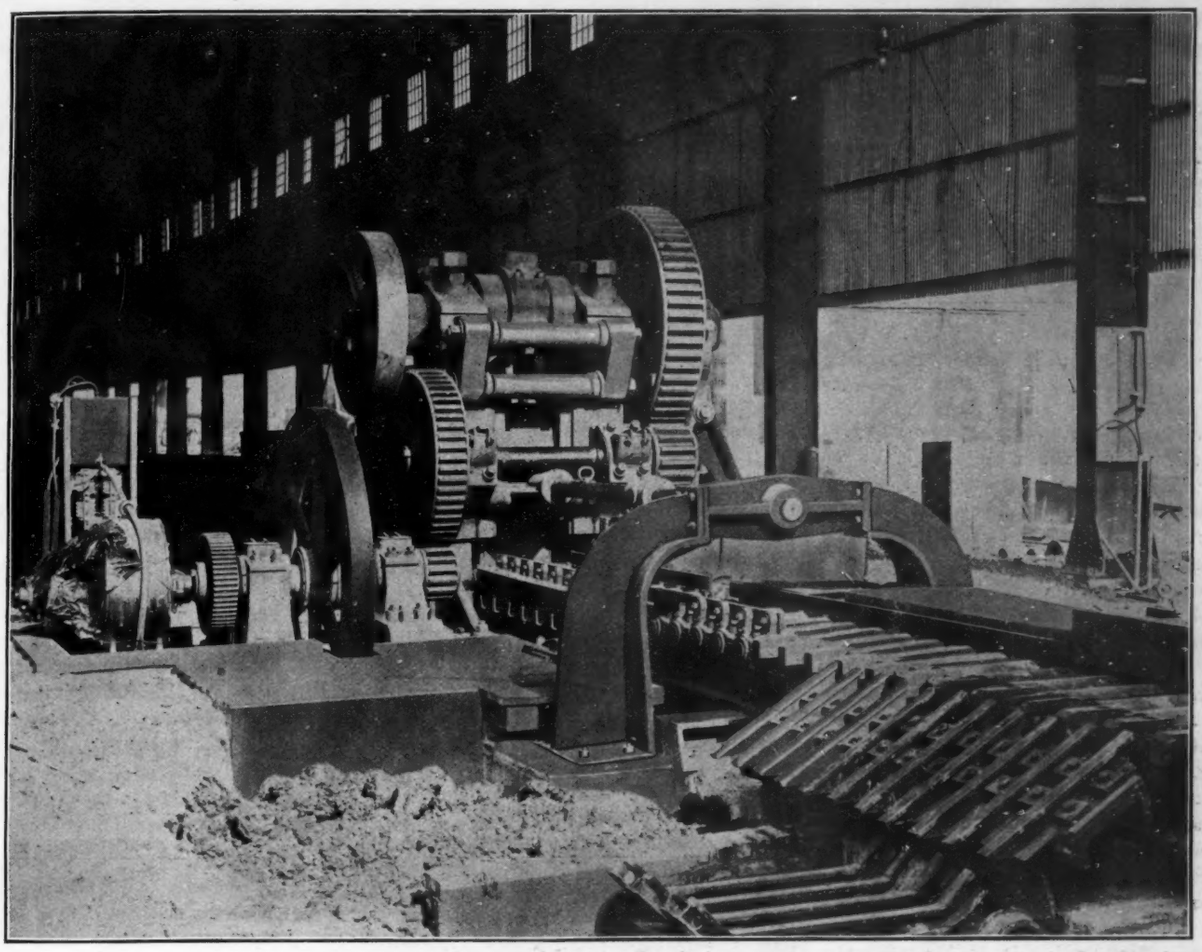


FIG. 6—BILLET SHEAR, ANDREWS STEEL CO., SHOWING LOADING SKIDS.

weighing 9,000 pounds is inserted in the gear train between the motor and shear.

Sheet Bar Mill.

From the shear, billets are delivered to a motor-driven table leading to the sheet bar mill, 170 feet south of the bloom shear and installed in a separate building, a corrugated iron roof covering the table between the bloom shear building and the sheet bar mill. The bar mill building is open at the ends and a craneway extends through it on either side, on which runs a 20-ton electric crane. The table from the shear to the mill is composed of apron plates with motor-driven rollers in between. The method of handling the billets is unique and pass in the two-high mill. The billet enters the bottom pass of the roughing stand; and as it goes through the rolls, it raises a switch shown in Fig. 10, which drops after the billet is passed. The billet is caught by pinch rolls shown just beyond the switch, and is forced back and up along the switch, so as to enter the succeeding top pass. This is repeated until the desired number of passes have been made, and on the final pass, the bar enters a Y-shaped chute as shown in Fig. 9, which is on the approach side of the sheet bar mill. This chute carries it under the pinch rolls on the approach side, the upper one of which is shown in the immediate foreground of the illustration, and back along the stem of the Y. The pass is made. The run-out table of the three-high mill consists simply of apron plates, motion being given to the piece by the before-mentioned pinch rolls. The same is the case of the approach table to the two-high mill, which is formed by the chute just discussed. The run-out table of the two-high stand is driven and leads to the hot beds. The above is all covered by patents.

Hot Beds.

The hot beds are shown in Fig. 11, and extend at right angles to the run-out table of the finishing mill. They are 87 feet wide and 110 feet in length and comprise rails mounted on I-beams on concrete pillars spaced about 10 feet apart. Wire ropes

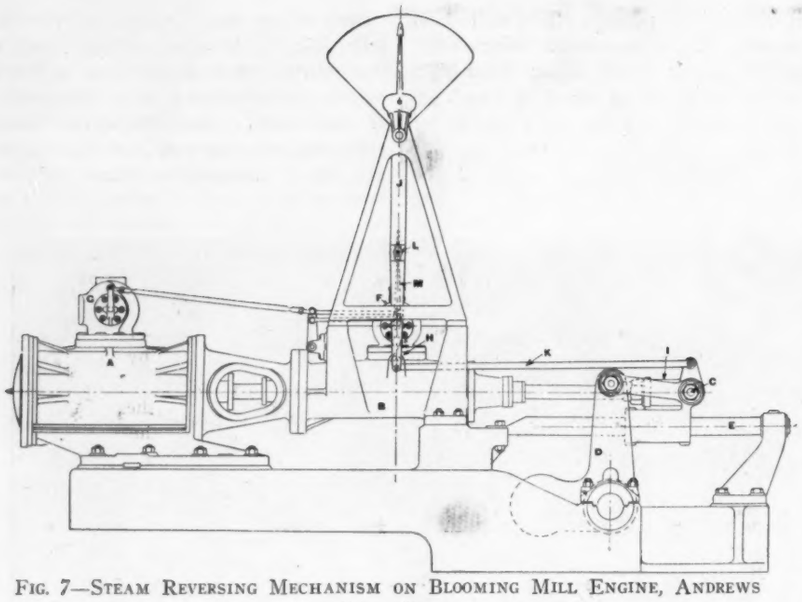


FIG. 7—STEAM REVERSING MECHANISM ON BLOOMING MILL ENGINE, ANDREWS STEEL CO.

are laid in between the rails carrying puller dogs, the ropes being driven from drums mounted on two shafts on the cold side of the beds, as shown in Fig. 11, and operated by electric motors. On the cold side of the beds is a motor-driven table leading to a 54-inch sheet bar shear which cuts the bars into the required lengths.

This shear is of the double pitman type, driven through compound reduction gearing by a 75-horsepower motor. A fly wheel 66 inches diameter, weighing 2,600 pounds is inserted in the gear train between the motor and shear. The shear is equipped with an automatic stop motion, gage and gag. This shear is required to take five or six bars at a time, so that it may keep up with the rolling mill. It is located under the crane runway, extending through the sheet bar mill building. The craneway also extends over the shipping tracks, permitting the rapid loading of product.

Power Plant.

The electric power plant of the mill is located in the lean-to of the soaking pit building and comprise two Lane & Bodley engines each direct connected to a 300-kilowatt, 250-volt direct-current generator. The hydraulic plant is also located in this building and comprises two Wilson-Snyder 12 x 20 x 14 x 24-inch duplex compound pumps and two 22 x 36⅜ x 10 x 36-inch duplex compound pumps of the same make. In connection with these, there is a 300-ton hydraulic accumulator.

Adjoining the pumps is the water-softening plant, We-Fu-Go system being installed and having 3,750 horsepower capacity. It is furnished by the William B. Scaife Sons & Co., Pittsburg. The water supply is obtained from the Licking river, which, in addition to a considerable quantity of suspended scale-forming matter, at times, contains some free acid. At times, the water is practically clear, but at other times, hard and full of corrosive substances. The water is sometimes soft, but usually carries a great deal of suspended matter. This system was also selected, in order to do away with the necessity of installing a standpipe for the storage of water for boiler purposes, the treating tanks of this system acting as storage tanks.

The system comprises essentially two treating and settling tanks, equipped with mechanical stirring devices operated by an electric motor, and a reaction or chemical mixing tank with a mechanical stirring device and jet pump for introducing the reagents into the treating tanks. There are also two mechanical gravity filters. All the above machinery is connected so that either treating tank can be used with either or both filters. The treating tanks are filled alternately with water. While a tank is filling, the reagents are introduced and thoroughly mixed with the water by means of the mechanical stirring device, consisting of a specially designed paddle revolved by the above-mentioned motor. When a tank is filled, the stirring device is stopped and the water is permitted to stand, in order to allow the precipitate to settle to the bottom of the tank. The softened water is removed from the tank by means of a hinged floating outlet pipe arranged to rise and fall with the level of the water, so that the water is always taken from the top. The water at the top being clearest carries the smallest amount of floating sludge into the filters, thereby increasing the length of time between

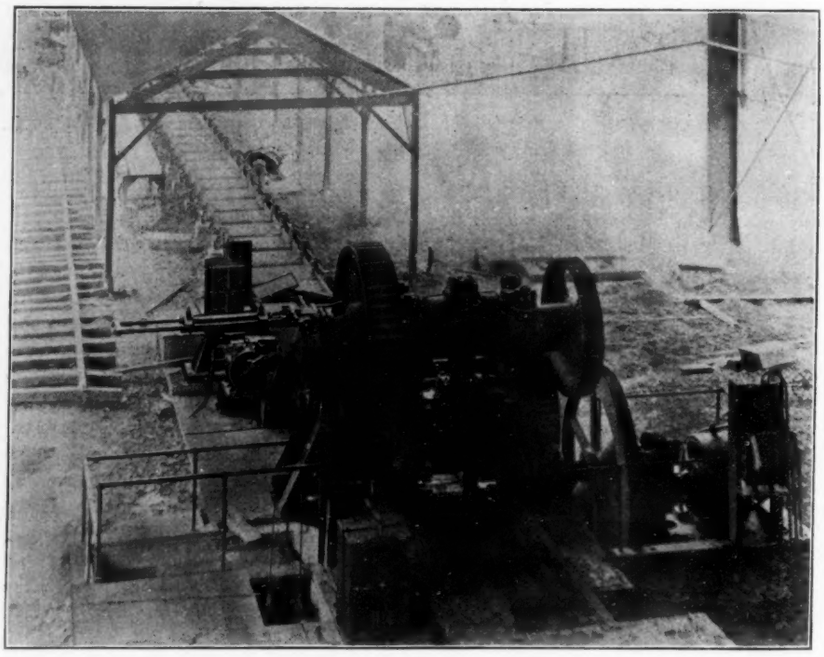


FIG. 8—BILLET SHEAR, SHOWING HYDRAULIC PUSHER MECHANISM.

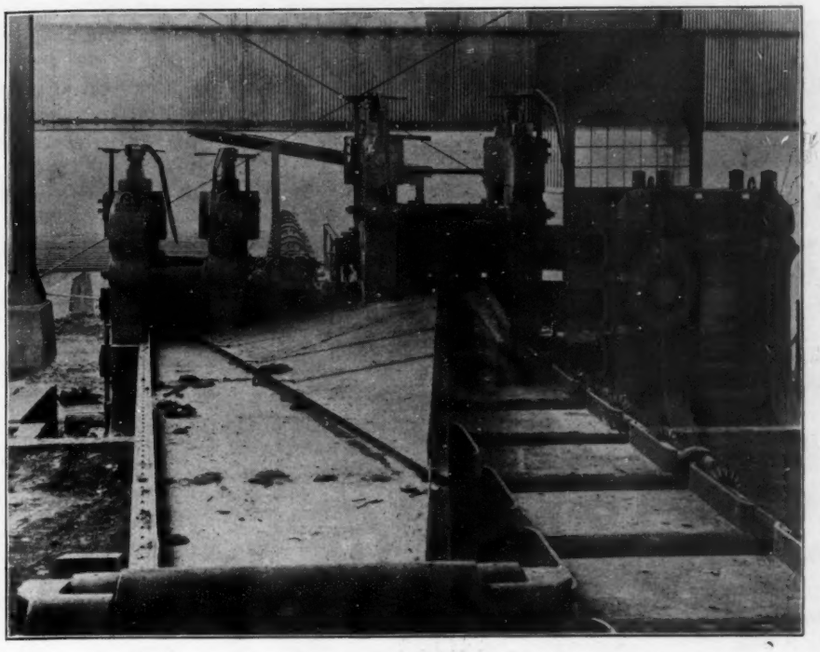


FIG. 9—APPROACH SIDE OF SHEET BAR MILL. ANDREWS STEEL CO.

the washings of the filters. The rate of flow to the filters is automatically controlled by means of a copper float on balanced valves. While the water in one tank is being treated and settled, the other tank is supplying the purified water. The interior of the plant is shown in Fig. 12.

Producer Plant and Boiler House.

As mentioned earlier in this article, producer gas is used in both the soaking pits and in the open-hearth furnaces. A producer plant and a boiler house are located between the main plant and the river and in the same straight line along the river bank. Between them is the coal storage, which will be described in detail later.

The boiler house is a building 181 x 29 feet, with a lean-to 36 x 22 feet, containing the feed pumps, two in number and each a 12 x 20 x 10 x 24-inch Wilson-Snyder duplex compound. The boiler equipment comprises ten 375-horsepower Stirling boilers set in five batteries of two each. A steel stack serves each battery. The boilers deliver steam to a common header from which it is taken to the engines in pipes supported on standards composed of two or four 6-inch pipes screwed in appropriate foot pieces and joined together at the top by a special casting on which the pipe is supported.

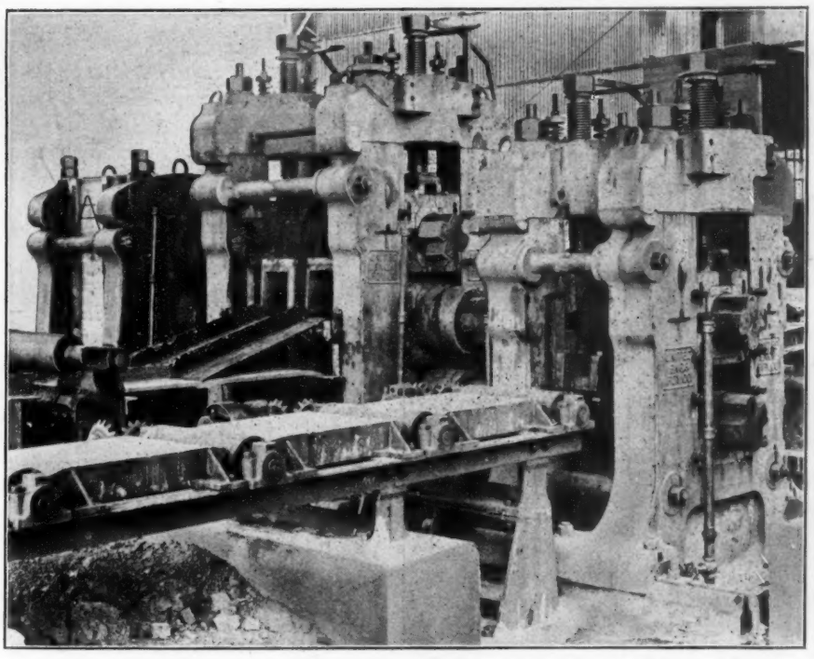


FIG. 10—RUNOUT SIDE OF SHEET BAR MILL. ANDREWS STEEL CO.

The boilers are equipped with Detroit stokers, built by the Detroit Stoker & Foundry Co., Detroit. A trestle from the coal storage runs through the boiler room and out beyond the boiler house, storage bins being suspended from it. Spouts lead directly from the storage bins to the stoker hoppers.

The producer plant building is 181 x 29 feet and contains 12 Duff producers. The trestle which runs through the boiler house extends through this building also. A steel partition divides the charging floor of the producer house into two parts, the partition extending down to within about 4 feet of the floor, enclosing the trestle. It thus forms a serviceable coal bin from which coal can easily be shoveled to the producers.

The coal storage plant heretofore mentioned comprises a Berquist bin of 2,000 tons capacity. This bin is divided into three compartments, in two of which is stored slack coal for the boilers and in the other lump coal for the producers. A double track skip hoist extends from the lump coal bin to the edge of the river, 68 feet below the yard level, on which the coal storage is located. A standard gage railroad track runs alongside the storage and a track hopper is installed into which slack coal is dumped and fed to an elevator which raises it to the appropriate compartment in the storage bin. In order to permit slack being loaded from boats to this bin, a hopper has been installed halfway up the skip hoist. From this hopper, a chute leads to the track hopper feeding the elevator. To handle slack from boats, it is only necessary to dump the skip cars halfway up instead of at the top. The cars are driven by an electric hoist installed in a house underneath the skip. The elevator is driven at the head shaft by a motor installed in a house over the bin. A 5-ton electrically-driven larry car on the trestle transfers the coal from this bin to the boiler from the producer house.

The engineering work on the plant

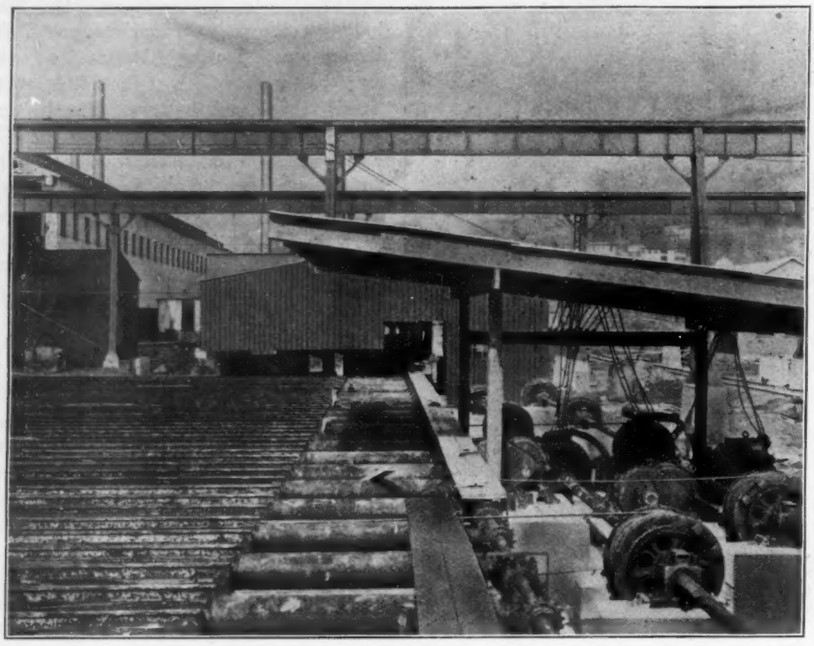


FIG. 11—COLD SIDE OF HOT BEDS. ANDREWS STEEL CO.

was done by the United Engineering & Foundry Co., Pittsburg. The erection was in charge of William N. Andrews, and of Theo. Niedlander, who superintended the erection of the machinery. The open-hearth plant was designed and built by John Morgan, all three of the Andrews Steel Co. The officers of the company are: President, J. A. Andrews; vice president, Jos. B. Andrews; secretary, William N. Andrews; treasurer, A. L. Andrews.

DETERIORATION OF CAST IRON FITTINGS IN SUPERHEATED STEAM LINES.

Crane Co., Chicago, has been seeking definite information on the subject of the effect of superheated steam on cast iron valves and fittings. The opportunity for investigation presented itself a few months ago, when a 14-inch high-pressure gate valve, which had been in service for four years, was taken out and replaced by a steel valve of similar design. The company, having a complete record of the tests of the iron which was used at the time this valve was made, was in a position to determine accurately what the effect of long-continued subjection to superheated steam really was. The salient points are:

A loss of strength in the body of 49 per cent, while the metal in the flanges, not being under quite so high a heat, and not directly exposed to the action of the steam, showed a loss of only 33 1/3 per cent.

Following is the detailed result:

Test on 14-inch No. 9 E cast iron gate valve, extra heavy, removed from a superheated steam line.

Steam turned on line, about August, 1903.

Valve taken out, September, 1907.

Time in service, 4 years.

Pressure of steam, 200 pounds per square inch.

Temperature of steam, about 590 degrees.

Original strength of cast iron, as shown by test bars, 22,400 pounds tensile strength.

Strength of bars cut from body of valve, 12,303 pounds, 11,608 pounds, 10,610 pounds, and 12,440 pounds, tensile strength, giving an average of 11,740 pounds. This shows a loss of strength in body after four years' service as compared with original test bars of 49 per cent.

Strength of bars cut from the flanges on the valve, 14,900 pounds, 15,250 pounds; average tensile strength, 15,075 pounds.

Loss of strength, 33 1/3 per cent.

It will be noted that in order to avoid mistakes several tests were made, as it will be seen that while the metal in the body shows a loss of 49 per cent as compared with the original test bars, the actual loss is somewhat less than this, for the reason that the body metal was thicker than the bars, and the cooling strains in a large casting tend to lower the tensile strength of the metal about 10 per cent.

Crane Co. has made determinations along this line, and finds, with test bars 1 inch square, showing a tensile strength of 22,000 pounds, it is safe to assume that bars cut from a heavy casting will show about 20,000 pounds. However, taking this low figure, the loss in the body was 41 3/10 per cent, which is sufficiently serious to condemn cast iron for valves and fittings on superheated steam lines having a total temperature of 590 degrees.

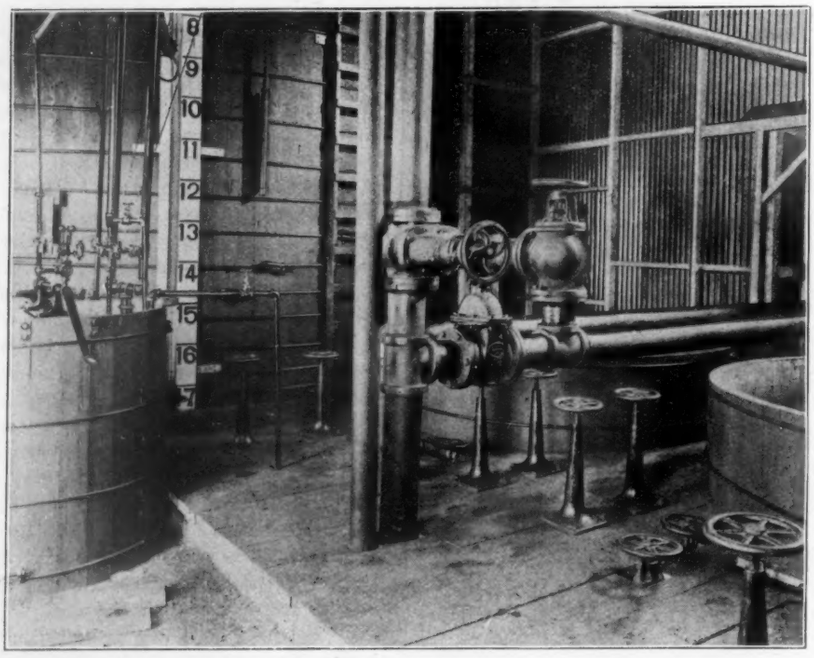


FIG. 12—INTERIOR OF WATER SOFTENING PLANT. ANDREWS STEEL CO.

THE PRACTICAL APPLICATION OF VANADIUM TO STEEL AND IRON

By J. Kent Smith.[1]

The unique attributes conferred by the judicious application of vanadium to steel, resulting in increased strength, prolonged life, and hence vastly increased margin of safety, are now well established, and vanadium steels of numerous types are being made regularly in many steel mills, while the properties of the steels obtained more than substantiate the numerous typical tests that have from time to time been published.

Fig. 13—Coal Storage Bins and Elevator. Andrews Steel Co.

In view of these facts it may be of some interest to particularize the best methods of incorporating the alloy, which it must be remembered exerts its power in at least three ways:

1. It possesses remarkable properties as a scavenger, removing oxides, nitrides, etc., in a very fusible form easily carried away to the slag. In this respect it differs markedly from some other deoxidizing alloys.

2. It toughens iron mainly by its solid solution under normal conditions in the carbonless portion, known as ferrite. To succeed in this respect the alloy must either contain free vanadium, or vanadium combined with some other element which also goes into solid solution in ferrite under normal conditions, such as silicon. The old prejudice against silicon *per se* in steel is rapidly dying out, when certain other conditions are absent. Silicon exists mainly in solid solution in ferrite, as does part of the phosphorus, and as long as the latter is small in amount the effect of a reasonable amount of silicon—well within the quantity necessary to influence the crystalline structure of the ferrite containing it—is found to be actually beneficial from a "mill" point of view. The writer has prepared many cold drawn seamless tubes of the highest quality from a very pure open-hearth steel containing nearly one-half of one per cent silicon.

3. It forms complex carbides of such nature as to statically greatly strengthen the steel containing them. These carbides are proved to add more strength to the steel when they contain chromium or nickel.

From the foregoing it will at once be seen that:

1. Two vanadium alloys may easily be of the same ultimate composition analytically and yet give widely differing properties to steel on account of their elements being differently combined. The laboratory determination of this would be tedious and commercially impossible, though the microscope helps much, but manufacturing precautions can assure the reaching of the desired end.

2. The greater the degree of fusibility and solubility possessed by the ferro-vanadium, the more satisfactorily it should behave, other things being equal. Certain definite alloys, containing iron, silicon, and vanadium are much more fusible and soluble in molten steel than plain alloys of iron and vanadium, and their use is advantageous.

3. Owing to the powerful affinity of vanadium for oxygen, and to the fact that the major portion of it is required for other purposes, vanadium alloys should only be added under deoxidizing conditions to metal that has previously been as well deoxidized as possible in the ordinary circumstances under the control of the steel maker.

4. Lastly, it must be remembered that chemically speaking, vanadium is the radicle of a powerful acid, and therefore it must be kept from contact at a high heat with any material

[1]American Vanadium Co., Pittsburg.

of a basic nature, such as calcareous slag.

Hence to apply vanadium to steels made by the ordinary commercial processes it is best to proceed as follows:

The Crucible Process.

In the crucible process the charge is made up of such ordinary stock as the specifications may call for; any chrome or nickel may be included in the initial charge. When the same is thoroughly dead melted or "killed," the vanadium alloy should be introduced, avoiding contact with the slag as far as possible, together with such extra manganese, in the form of ferro-manganese, as the special circumstances of the case may dictate. After the expiration of 20 to 30 minutes the contents of the crucible are to be skimmed and poured as usual.

Acid Open-Hearth Process.

In acid open-hearth practice, the furnace charge should be melted as usual, worked down with ore to about 0.4 per cent carbon, and preferably "shaken down" for the remainder of the decarburization. At the finish, the slag should be "supersilicated," that is, it should contain at least 52 per cent of silica, and should not contain excess of the oxides of iron and manganese; in other words, in melter's parlance it should be "neutral." The fracture of the slag, and its "thickness" in proportion to the heat present, will tell the story to the practical eye. Silicon pig, warmed on the breast of the furnace, and any necessary proportion of ferro-chrome are next added, a few minutes later the ferro-manganese. The flame is then "blanketed" and the vanadium alloy added in large pieces; three minutes will suffice for its working through the bath, which is meanwhile rabbled. Tapping and teeming are then performed as usual. Any nickel may be charged at the outset.

Basic Open-Hearth Process.

In basic open-hearth practice the furnace is charged with good stock and limestone, any required nickel being also added. The charge is melted and worked down to about 0.4 per cent carbon, then "shaken down" to decarburization. The slag must be in good condition and free from excess of metallic oxides. The necessary ferro-chrome is now charged, due allowance being made for loss; in good practice a charge of 1.3 per cent of chromium (in ferro-chromium) would give 1 per cent chromium in the residual steel. It may be necessary to closely follow this addition with a little fluorspar in order to keep the slag sufficiently open. Ferro-manganese is then added in lump form to the bath, and when the metal additions are incorporated the furnace is tapped. After a small quantity of steel has run into the ladle, the ferro-vanadium and any further high grade ferro-silicon required both broken up small and preferably preheated, are added, all additions being completed before slag appears. Rabbling the contents of the ladle greatly assists matters.

Bessemer and Tropenas Practice.

In Tropenas practice the converter is charged and blown as usual, and deoxidation performed in the converter with manganese and silicon. The ferro-vanadium is added in the ladle as in basic practice, the metal being "skimmed" as it issues from the converter. Nickel would be added with the charge, and chrome before or with the deoxidants.

The same remarks would apply to Bessemer practice as to Tropenas practice, though the preparation of high grade alloy steels is not usually attempted in the Bessemer converter.

The percentage of loss concomitant with the addition of vanadium has often been inquired. For obvious reasons it is impossible to give a simple answer on this point, as that portion of vanadium used up in doing scavenging work passes into the slag. But it may be said that in an average of many "acid" charges, where all precautions were taken to secure a deoxidized bath as far as possible, the "loss" amounted to about 10 per cent, a portion of which missing vanadium had been used up in doing useful work. Analysis of the open-hearth slags showed them to contain 0.26 to 0.30 per cent of vanadium, which—taking into account the proportions of slag, metal and vanadium used—substantially bears out the "loss" figure given. In basic practice the loss is necessarily somewhat higher and will approximate between 15 per cent and 20 per cent, partly on account of the greater proneness of basic metal to retain oxides in solution. By the use of a system of double ladles, however, thoroughly deoxidizing in the first, and transferring its contents through a wide nozzle to a second well-heated ladle where the ferro-vanadium is added, "acid" conditions as to loss may be paralleled.

Vanadium in Cast Iron.

In cast iron, in addition to the constituents present in normal steel another constituent in comparatively large quantity is present in the form of graphite, which of course cannot from its nature be in itself influenced by any alloy. Steel in its normal state is a non-homogeneous body, but in comparison with gray cast iron it is very homogeneous. Nevertheless the benefits which accrue from the proper incorporation of a judicious amount of vanadium with cast iron, especially in chill and cylinder castings, are very great, even if they are not so spectacular in their nature as those which are conferred to steel. But strength, rigidity and resistance to wear are all increased by the addition of vanadium to gray iron, while vanadium martensites are much tougher than ordinary martensites. The outside case of a chilled casting is practically a much supersaturated martensite. Chilled rolls containing vanadium have shown a truly remarkable increased resistance to wear in service.

In applying vanadium to cast iron, it must be remembered that nothing like the heat of molten steel is at hand, consequently the metal is not in such a state of molecular activity; therefore, one should use a finely divided alloy of low melting point. If the air furnace be used in preparing the molten iron the proposition is a very simple one; when the charge is melted, a little lump ferro-manganese is added, then the vanadium alloy is added to the furnace and rabbled well through at intervals during the 20 minutes or half hour which intervenes before pouring the metal. Where the iron is melted in the cupola, the fact of the ready oxidability of vanadium at once precludes its addition to the charge, and the ordinary non-molten metal does not too readily dissolve in the comparatively cold ladle contents, for the reasons before stated. If such alloy be used, molten pig iron in weight about five times that of the alloy to be used is introduced on to the finely broken vanadium alloy contained in a crucible or Schwartz furnace. The mixture is heated for about half an hour for incorporation and is poured into the foundry ladle at the same time as the molten cupola metal, the whole being well rabbled. If, however, a special ferro-silico-vanadium be used, which alloy has a very high degree of solubility, the vanadium addition, non-molten, can be made to the ladle direct. The alloy is pulverized and is added, together with about 0.3 per cent of ferro-manganese (reckoned on the iron to be vanadized in the ladle) direct to the molten stream of iron as it leaves the cupola spout, distributing

the addition as well as possible. The contents of the ladle should be well rabbled before pouring.

The same procedure applies in the case of malleable iron, a product made by suitably annealing or "cementing" white cast iron of a definite composition in iron ore, oxide of iron, or other "packing." The carbon in the exterior layer is oxidized, the temperature required to effect this not being sufficiently high, however, to bring about the complete oxidation of the dissolved vanadium; while the combined carbon in the interior is changed to the graphitic or temper form, the ferrite liberated being toughened as before described. Hence vanadium adds increased toughness to malleable iron in greater measure than it adds increased strength, for the reasons already enumerated.

Vanadium in Wrought Iron.

The incorporation of vanadium in wrought or puddled iron is theoretically much more difficult, because wrought iron is essentially a precipitated metal, permeated more or less by frozen mother liquor of iron in which latter the vanadium is more especially contained, and also because the slag of the puddling furnace is strongly basic in its nature and removes vanadium from the bath much as it removes phosphorus. The writer has never met with a Swedish puddled iron containing much over 0.02 per cent of vanadium, while the acid open-hearth steel made from pig iron smelted from the same ore frequently contains 0.08 per cent of vanadium.

It will thus be seen that in no case but the last does the correct addition of vanadium present any difficulty, and results follow with certainty as long as due cognizance be taken of the simple facts concerning its properties and attributes detailed in the foregoing.

ADDITIONAL METHODS OF TRACING THE PROGRESS OF THE WORK[1]

By Oscar E. Perrigo.

In a former article[2] several methods of tracing work through the various departments of an establishment were illustrated and described, but the importance of the work of looking after the progress of orders and of promptly and accurately locating, not only the larger and more important portions of the work upon an order, but also the various component parts of it, upon which work may be progressing simultaneously in several departments, would seem to demand further consideration and discussion.

ORDER NO.	
TRANSFERS	
1	9
2	10
3	11
4	12
5	13
6	14
7	15
8	

Fig. 1—Transfer Card Front. 2 x 2¼ Inches. White, Red and Blue.

There are other and quite important advantages to be derived from a system of this kind that will doubtless be appreciated by the superintendent, or whoever has charge of the general conduct of the shop routine. One of the matters upon which much time and thought, as well as active energy, must be expended, is to so organize and develop the several departments that the capacity of each will be such that they may be kept working at their full capacity and efficiency and their several products be as nearly as possible the exact amount required to contribute their parts to the general output of the plant.

It sometimes happens that one department may get behind in its work and be obliged to run overtime, at the usual loss of efficiency which such a necessity entails, while a neighboring department may be able to turn out its work faster than it is really needed, and this fact being known to the force, is liable to cause a falling off of efficiency also. The superintendent cannot see all his departments at once, but knowing the capacity of each, and having the work and the speed with which it is performed graphically shown by a proper mechanical device which information may be readily seen and grasped, carefully studied, and the results produced by each department, day by day, analyzed and compared, he can form accurate estimates of all these matters, apply the proper remedies at the right points and correct any errors or lack of proper supervision that he may find. The information he obtains will necessarily strengthen him in his position, in his grasp of the work of the establishment and very much enhance his own personal efficiency in the management of its affairs.

The necessity and advantage of some system for ascertaining and recording these facts for reference would seem to need no argument, yet there are still many manufacturing establishments, some very important ones, in which little attention is given this matter. The writer recently visited a manufacturing concern, employing about a thousand men, and having a large and well equipped foundry, machine shop, forge shop, pattern shop, and, in fact, more than the usual departmental facilities for manufacturing, all well housed in buildings of admirable design and construction. As usual, most of the work passed in regular routine through several departments, and parts of an order were being worked upon in several departments at the same time. Yet in this vast establishment with its numerous departments there was no regular plan or scheme for locating an order that had been once issued, and little could be told about it except that on a certain day an order for a certain thing was issued to a

COMPONENT CARD NO.
NUMBER OF COMPONENT CARDS ON THIS ORDER
THIS CARD IS FOR

Fig. 2—Component Card Back, 2 x 2¼ Inches. Yellow.

[1] Seventh of a series of articles on cost-keeping and shop management.
[2] Iron Trade Review, March 5, 1908.

certain department, where the work upon it was supposed to have been commenced. The clerk whose duty it was to make out the orders for the various component parts of the product covered by this order, sent them to their initial departments where operations were begun. After this, if information was desired as to the principal order, or any of the parts of it, the procedure was "we know where that order started in and we go out and hunt it up." This process might take anywhere from 15 minutes to an hour. Multiply this by the number of different components upon which information might be wanted during the progress of the order through the different departments, and multiply this product by the number of orders in progress in a plant of the dimensions of the one in consideration, and some idea may be formed of the amount of time that would be wasted in this manner, as well as of the delays and the generally unsatisfactory nature of the information that would be obtained.

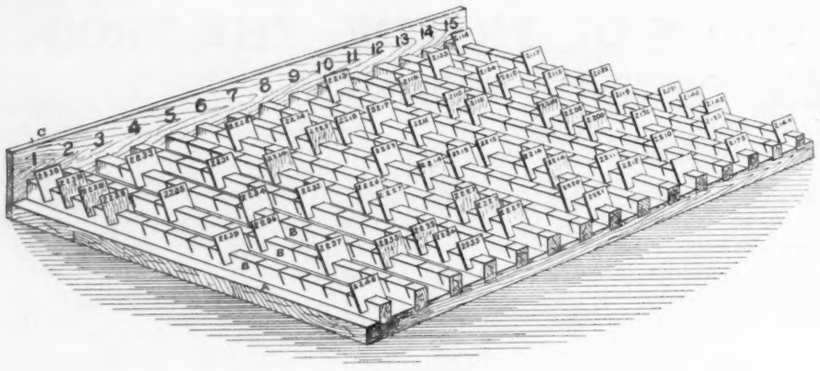


FIG. 3—TRANSFER CARD HOLDER FOR TRACING WORK.

Contrast this condition with the operation of a system by which we may instantly know the location of the principal parts of the order, the location of its various component parts, and the time which each of these have been in each of the departments through which they have passed, and there should be little hesitation in adopting a system by which these results may be obtained.

In addition to these results we may have the important information, which the superintendent may get at any time, of the condition and progress of the work in any one, or in all the departments, by consulting the recording devices designed for this purpose, and it will be readily seen that we have a valuable and indispensable system to the economical and efficient working of the plant.

From the above it will be seen that the several items of information which we wish to record for reference are: (a) the fact that a certain order is "in the works," (b) the time when the order went into the shop, (c) the department in which the work was begun, (d) the number of component part orders relating to this principal order, in the works, (e) the same initial record of these components as we have of the principal order, (f) a complete history of all transfers of these orders, showing their line of progress and the time of each transfer.

The human memory is not only of limited capacity, as to the number of facts it is able to retain, but inacapable of retaining them for any considerable length of time with the degree of accuracy which is required in what we might properly term a record. In consequence of these limitations and the continual changes of location of the material things represented by the recorded facts, the memory soon arrives at a chaotic condition that is of little or no value. Therefore to accomplish the required results we must have a recording system adapted to work mechanically as far as practicable, in order that it may be operated with sufficient rapidity as well as accuracy, and that the facts which have been recorded may be permanently retained, and that the changes of material may be indicated with fidelity and permanency.

An important advantage of this method of making a record is that it presents, in a graphic manner, the required facts to the operator, and makes them equally plain to any number of persons who may have occasion to make use of the information thus recorded.

To formulate a system of recording the progressive movements of the orders and the work they represent, through the various departments of the plant, we must first install at some central point an office which shall in effect be a "clearing house" for all the departments of the plant. This will be the post of the transfer or tracing clerk. All production orders start from here on their course through the departments. All transfers of work from one department to another are made here. Often the work or material itself is brought here, with the order, and when the proper entries have been made the work is sent to the next department through which it is to pass. For reasons of economy in transportation expenses, much of the material in process is sent directly from one department to the next, but only after it has constructively, if not actually, passed through the transfer office, where it is "entered" by the presentation of the production order, and "cleared" by the proper dates being stamped, the transfers made, and the production order dated and "passed."

In this transfer office there will usually be a transfer clerk and an assistant, who make the entries and transfers, and one or more laborers, as may be necessary, to handle such material as may be brought in on its way to the next department.

The method of making and recording these transfers is as follows: The production order is first sent to the transfer clerk, who makes out a transfer or tracing card of the form shown in Fig. 1. If the order is to take its usual course this will be a white card; if it is an urgent order a light blue card will be used; and if it is a "rush" order a light red card. These cards are printed on the front only, and the order number is all the entry necessary, unless the clerk desires to make some memorandum of the order, in which case he will use the back of the card. Should the order be for a component part of a principal order, or as is frequently called a "sub-production order," a yellow transfer card will be used. This will be printed on its face the same as shown in Fig. 1, while the back will have the form shown in Fig. 2. In filling out this card the order number will be entered on the face, and on the back will be entered a serial number of the component parts for this order number only. In the space headed "number of component cards on this order," the total number of these cards will be marked, so that the clerk may know when he has

collected all the component cards belonging to this particular order. A brief memorandum of the contents of the order is written after the words "this card is for."

These transfer record cards are filed in the card holder shown in Fig. 3. This consists essentially of a base board 4, upon which is fixed a series of strips, B, B, which have a series of inclined saw cuts as shown, in which the transfer cards may be quickly placed. On the further side of the base board A, is fixed an upright board C, upon which is indicated the numbers or the names of the different departments of the plant. In this case there are 15, arranged as follows:

General Departments.

1. Drafting Room.
2. Pattern Shop.
3. Foundry.
4. Forge Shop.
13. Painting Department.
14. Inspecting Department.
15. Shipping Department.

Machine Shop.

5. Planing Department.
6. Drilling and Boring Department.
7. Turning Department.
8. Milling Department.
9. Gear Cutting Department.
10. Grinding Department.
11. Assembling Department.
12. Erecting Department.

In serially numbering these departments it will be noticed that the usual course and progress of the work is followed, as a matter of convenience in making the transfers. In the transfer card holder here shown each of the slotted strips B, is devoted to a certain department. For a larger output more space and a much greater number of slots will be needed. For a large concern it will be advisable to put only two or three departments, or even but one, on a single board, as several boards of moderate dimensions may be more conveniently arranged within easy reach of the transfer clerk than one large one. This will be the case when separate orders are issued for each component part and a like number of transfer cards are necessary. It should be remembered, however, that it is the usual custom to have many of the component parts made on stock orders and sent to the finished parts store room, from which they are drawn on the requisitions of the assembling and erecting departments as they are required. This method will eliminate a large portion of the component part orders and, as is well known, reduce the cost of such parts by having them made in large quantities.

The operation of making and recording transfers and tracing the work through the various departments is as follows: The transfer card shown in Fig. 1, having been filled out, it is placed in the portion of the card holder allotted to the department where the work is to begin. Thus, if drawings are to be made, it will be placed in the first strip, B, the date having been stamped in the space opposite the department number. When the drawings are completed and sent to the transfer clerk, he sends them, with the production order, to the pattern shop, if patterns are to be made, and the transfer card is placed in strip 2, representing that department. When the patterns are finished, the order is sent to the transfer clerk as a notice that they are ready for the foundry. The patterns are then ordered to the foundry and the order for castings sent there, while the transfer card is placed on the foundry strip. Each time the transfer card is moved from one department strip to another a new date is stamped upon it. If the method followed is to make separate production orders for drawings, patterns, castings, machine work, etc., then these several orders will be dated by the transfer clerk and sent to the cost clerk as soon as they are received from the department that has performed the work.

When the work of one department begins before that of the previous department is completed the original transfer card will be dated to show when work began in the second department, an x marked after the order number to call attention to a card left behind, and the card advanced to the next department strip. A duplicate card is then made out, in red ink, and placed in the first department strip. This remains until the work is completed in the first department, when it is dated as being transferred to the second department, and removed from the card holder, but held for reference until the order is completed. For instance, in the case of a "rush order:" The pattern shop is at work on the order, as fast as individual pieces are finished they are sent to the foundry to be molded and the castings made. The original transfer card is marked, dated and advanced to the foundry strip, and a duplicate made, in red ink, for the pattern shop strip in the card holder. This card is again dated when the patterns are all completed, removed and filed, awaiting the completion of the entire order. This is the usual course. However, if ample space has been provided in the card holder, there are a number of advantages in allowing the delayed cards to remain in the strip devoted to the department in which the work was done. The fact that they are written in red ink sufficiently distinguishes them from leading transfer cards.

Component part transfer cards, (shown shaded in Fig. 3,) are handled the same as the principal order cards. When the parts are completed and sent to the assembling or erecting departments, the transfer cards may be left in the assembly department strip so as to show the fact that the work they represent is ready. They may, however, be withdrawn entirely from the card holder and placed in a similar but separate card holder labelled "Orders Completed," so as to be convenient for reference by the transfer clerk and the inspection of the superintendent.

By the use of these transfer or tracing cards all movement of the work in progress is accurately recorded and the location of any order, or any component part of an order, in process, can be instantly known. Another equally important result attained by this method is that the number of orders in the different departments is shown at a glance, and the relative condition of the work in the several departments is graphically shown. Still another important advantage gained is that by consulting the dates on the transfer cards the length of time which any order, or the orders in general, have been in any department is accurately known; consequently the promptness of each department in handling work is easily ascertained. Thus the card holder and its transfer cards is an accurate and valuable indicator by which the superintendent may gain much information as to the efficiency of the plant as a whole, and the relative efficiency of the different departments.

There are still those managers who prefer books rather than cards or mechanical devices for keeping all classes of records, and they advance quite plausible arguments in favor of their preference. A book record is permanent as long as the book is preserved, and books may be stored in vaults for any length of time. Cards are more likely to be misplaced than a book entry is to be wrongly written. Cards may be lost. An accident may overturn a card drawer, or displace those in the card holder, and so on. It must be admitted that a book record is a safe method, but it is slow. A transfer or tracing record need not

be as permanent as a ledger record, but it should be quick as well as accurate.

Still a book record is sometimes preferred, and if some manager desires this method he should have the best, which will also be the most simple and practical form for the purpose.

Such a record is shown in Fig. 1. These sheets are arranged for a loose leaf binder, so that they may be removed from the cover and filed for future reference, and the handling of the book may be facititated by having in it no more sheets than are necessary for the current work. In using this method of recording the transfer of orders and work, and of tracing their location whenever necessary, the entry is made of the number and contents of the order, and the date of its receipt. Next the date of its being sent to the department in which the work is to be commenced is entered. The principal orders are entered serially and each is followed by the orders for the component parts, and which bear the same order number, with a special serial number confined to the principal order and written in red. This complicates to some extent the indexing of the pages, so that the order wanted may be readily found. To accomplish this the number on the indexing space is written in two parts. In this case the "even hundreds," (the figures representing hundreds and thousands) are written but once, and the figures representing units and tens are writen on each succeeding page until another hundred is reached. This index number corresponds with the order number of the first line of the page. When a greater number of figures are necessary they may be similarly divided.

When each order, whether a principal order, or a sub-production order, (that is, for a component part,) has its individual serial number, and the numbers of the component part orders follow serially the number of the principal order to which they belong, as they may easily be arranged to do, the page of the record book may be of the proper length to contain 50 lines. The indexing will be simplified and the work of making transfers, and of tracing orders will be considerably reduced.

Transfers of material are made in the manner heretofore described and entered on the record by simply stamping the date in the space in the column representing the department to which the transfer is made. These columns are of proper width to admit of the use of a rubber dating stamp, so that the dates may be entered very rapidly. There is a column at the right of the page for any remarks that may be necessary.

While this record is a fairly satisfactory one so far as the work of the transfer clerk is concerned, particularly in a comparatively small establishment, as a graphic representation of the number of orders in any particular department, or in the whole plant, or the relative numbers in the different departments, it is not very satisfactory to the superintendent, or other official in charge of the works, as the current orders may be entered on several different pages, and considerable time must be spent in tracing them out to get a comparatively

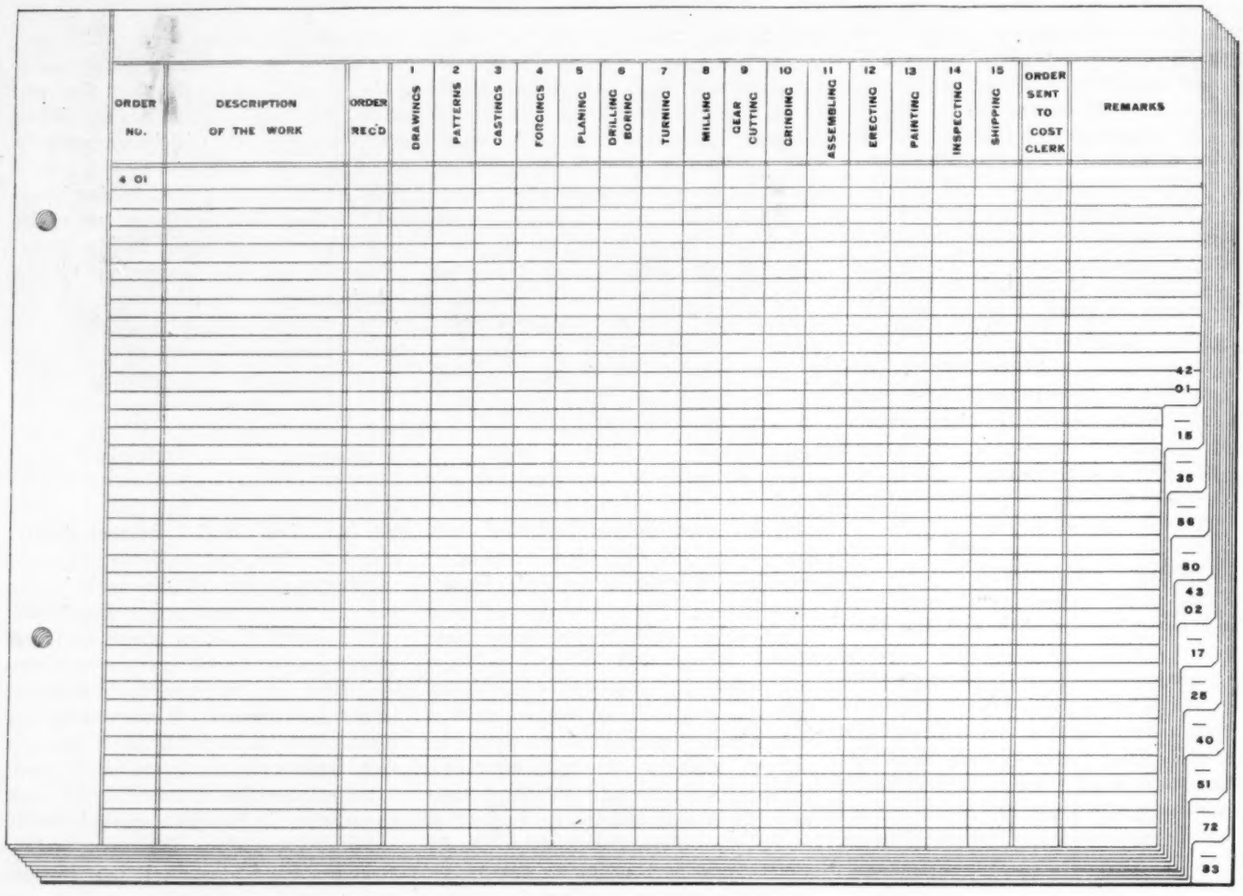


FIG. 4—A PAGE OF THE TRANSFER AND TRACING RECORD BOOK. SIZE, 12 x 17 INCHES.

good idea of the situation in any given department. It is true that this information may be had by visiting each department and the examination of orders in hand, but even this does not give a readily grasped, comparative condition of the work in the different departments.

A very useful addition to the usual form of production orders consists in having the names of the departments printed on the back, in the form shown in Fig. 1, and the dates of the several transfers stamped therein. Thus the order itself will carry a history of its course through the works, wherever it goes, as well as leaving its record of these transfers at the transfer office.

The importance of full, accurate and ready information of the progress of all orders through the works is so great that any system of recording the course and the dates of these movements is valuable and almost indispensable. The better this system can be made the more valuable it becomes. In seeking to better any existing system we must aim at three desirable points, namely: accuracy, speed, and graphic representation of conditions.

PLANT FOR THE MANUFACTURE OF STEEL ALLOYS.

The United States Metal Recovery Co. has begun active work upon the construction of a plant at Frisco, near Ellwood City, Pa., for the treatment of rare metals, such as tungsten, vanadium, uranium, etc., for use among the steel industries. The plant will consist of the main building 85 feet by 150 feet, laboratories covering an area of 50 feet by 100 feet, power house 50 feet by 50 feet, and office building 40 feet by 75 feet. The buildings will be of concrete construction, particularly designed to meet the requirements of the operations which will be conducted in them. It is also planned to erect a number of substantial homes for the employes of the company, over 200 lots having been platted for this purpose. The work is now being advanced on the smaller buildings of the plant. The processes of manufacture which the company will use, are fully protected by patent, and it is expected that research work in an advanced manner not before attempted in this country, will be carried on. The officers of the United States Metal Recovery Co. are as follows: President, Robert McKnight; vice president, Jean De Backer; secretary and treasurer, Walter S. Butler, Pittsburg. The company's offices are in the Peoples Bank building, Pittsburg.

THE DAKE STEAM TURBINE.

The accompanying illustrations show a new turbine, in which the steam is made to repeat its action upon the buckets of the same wheel, as in the Riedler-Stumpf type. This turbine is the invention of Chas. W. Dake, Grand Rapids, Mich., and is being manufactured by the Dake American Steam Turbine Co. of that city.

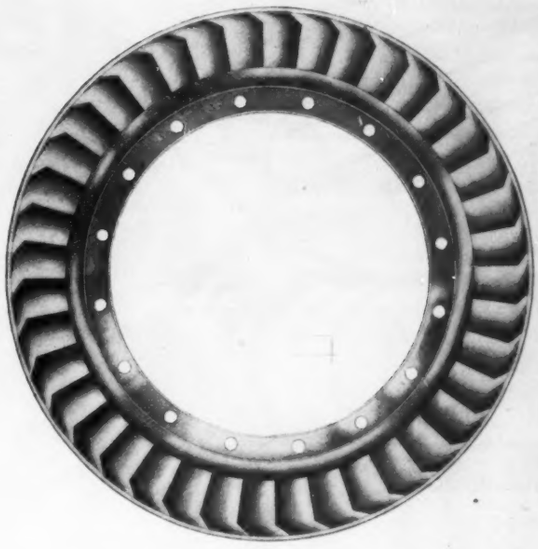


FIG. 1—RING OF MOVABLE BUCKET.

FIG. 2—DAKE ROTOR ASSEMBLED.

In Fig. 1 is shown a ring into the side of which the buckets are milled and which is bolted to a disk to form the rotor of the machine as shown in Fig. 2. Fig. 3 is a detail view of one of these buckets and shows a peculiarity of them, in that they are cut in steps which permits the better utilization of the space afforded by the thickness of the disk. This also preserves a nearly uniform distance between the discharge end of the nozzle and the wall of the buckets.

The complete rotor comprises a disk, upon which two of these bucket rings are bolted, as shown in Fig. 2. The guide nozzle is placed between the bucket rings as shown in the drawing, Fig. 6. Fig. 4 is a diagramatic view of the buckets and nozzles. The construction is such that the steam is guided directly upon the working surfaces, reducing the loss due to the formation of eddy currents. Experiments made by the inventor show a considerable increase of torque, which can be produced with a given nozzle and rate of flow by the use of this form of bucket. The nozzle block is shown in Fig. 5 and in section at A, Fig. 6, and also at A in Fig. 7, the latter being a section of a multiple stage turbine. The buckets are cut down on a bevel at their outer edges as plainly shown in Figs. 1 and 3, and the nozzles are extended upon a corresponding bevel as shown in Fig. 5. This confines the steam against the

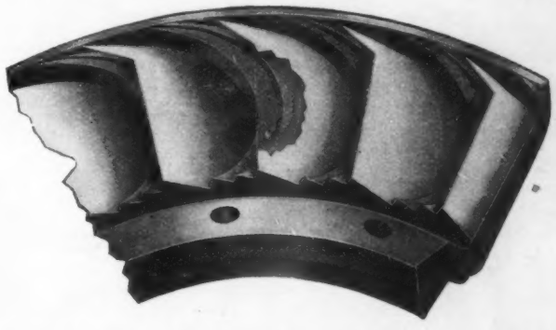


FIG. 3—DAKE BUCKET, SHOWING BOUNDING WALL AND BEVELED EDGE.

curved wall of the bucket. The nozzles are produced by inserting wedges C C, Fig. 4, into passages of rectilinear cross section, the wedges being varied to produce any form of nozzle desired, and adapted to any degree of expansion with a standard form of construction.

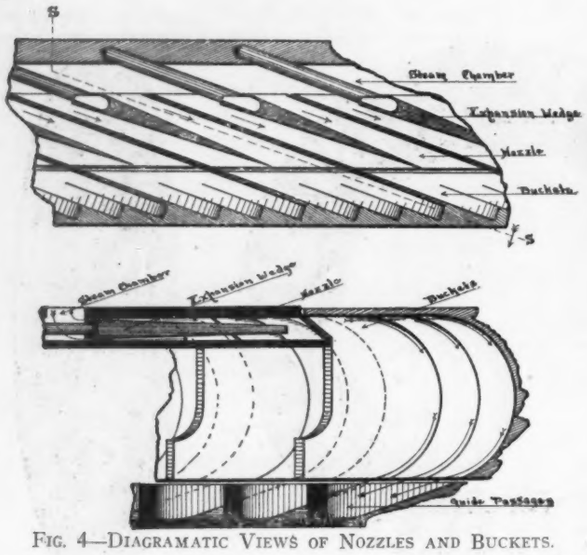


FIG. 4—DIAGRAMATIC VIEWS OF NOZZLES AND BUCKETS.

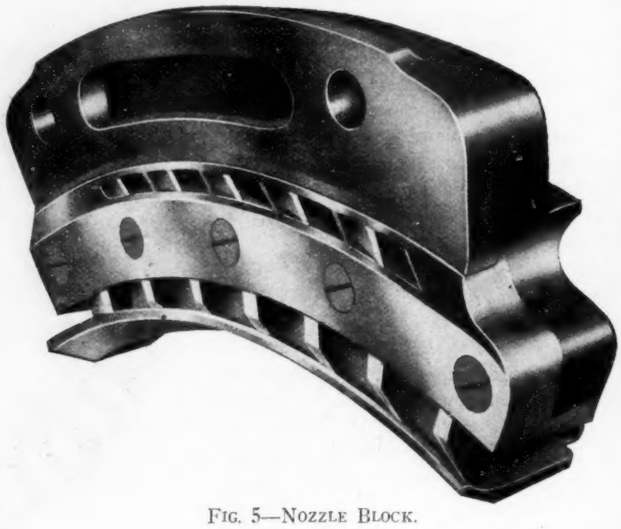


FIG. 5—NOZZLE BLOCK.

Referring to Figs. 6 and 7, the action of the steam can be clearly understood. It passes from a steam chamber, in the nozzle bucket through the nozzle, and is discharged upon the outer edge of the movable bucket D. This bucket deflects it, causing it to give up a portion of its velocity and energy to the moving disk, and then discharges it into the passage of the stationary guide-block A underneath the nozzle block. This guide-block causes it to impinge upon the moving bucket E upon the opposite side of the rotor, it escaping from the outside edge into the exhaust passage, whence it is carried to the atmosphere in the single wheel machine, or to the next stage as shown in Fig. 7, where more than one rotor is used. In turbines of this type even the single wheel machine is compound, as the steam acts twice upon different sets of buckets.

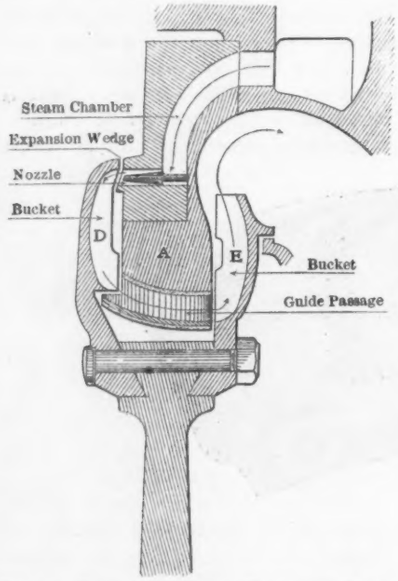


FIG. 6—SHOWS PASSAGE THROUGH RUNNING BUCKET AND GUIDE BLOCK.

The governor is of the centrifugal fly-weight type and is direct connected to the turbine shaft. In the single wheel machines the governor operates a pilot valve, which opens and closes a port governing a piston valve. This valve in turn admits steam to the turbine or shuts it off, the admission always being at the maximum pressure. In the multiple stage turbine, governing is accomplished by a make-and-break connection of a shaft, driven by worm gearing, with a shaft connected to a rotary valve. One-quarter turn of this valve opens or closes the ports leading to the nozzles. The connection between the shaft sections is made by a clutch operated by a forked lever direct-connected to the generator. Lubricating oil under pressure is supplied to the journals by means of an oil pump driven by the machine itself. Each journal also has an oil ring by means of which lubrication is continued, if, for any reason, the supply of oil from the pump is interrupted.

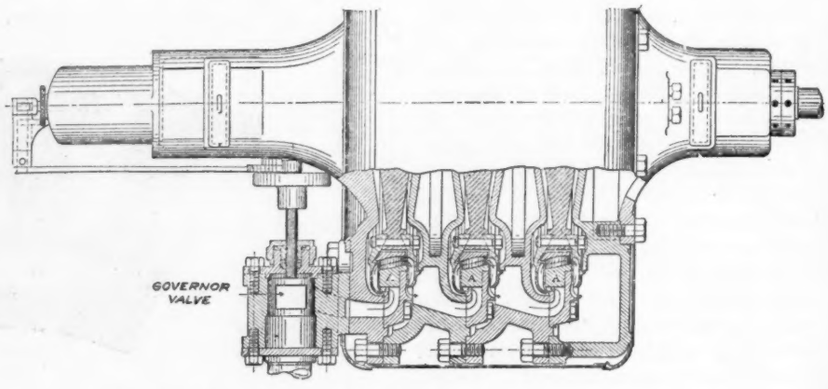


FIG. 7—THREE-STAGE DAKE TURBINE. SECTIONAL ELEVATION.

The repeated action of the steam makes it possible to attain a high degree of efficiency at moderate rotative speeds, and the turbine can be

built for direct connection to electric generators, fans, blowers, etc. It is built in sizes from 10 horsepower up, and may be made reversible with but little addition to the weight and complexity.

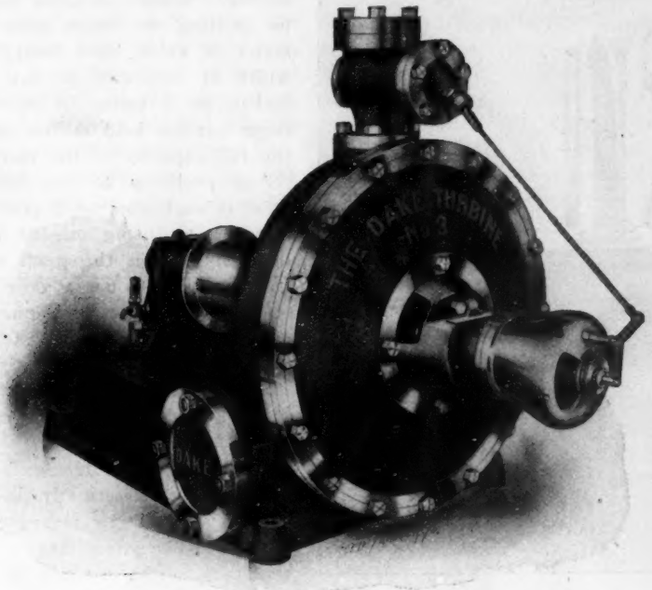


FIG. 8—DAKE SINGLE-STAGE TUREINE.

Fig. 8 shows a single stage 10-horsepower, and Fig. 9 a three-stage 100-horsepower machine. The company is now building a 375-horsepower turbine, which is to be reversible, and which will, this spring, be installed in a steam yacht for demonstration purposes.

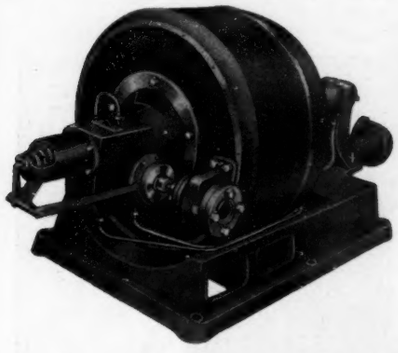


FIG. 9—THE DAKE 100-HORSEPOWER, 3-STAGE STEAM TURBINE.

Officers of the National Cash Register Co., Dayton, O., announce that they closed down only temporarily owing to local conditions not relating to their legitimate business and that it is their expectation to resume shortly.

A GOULD & EBERHARDT RACK CUTTING MACHINE.

The accompanying illustrations show a new design of rack cutting machine containing several new features, which has recently been brought out by Gould & Eberhardt, Newark, N. J. The most important change made in the designing of this new line is in the bed, which was formerly of the box leg type supporting the main table bed. The new construction provides a bed of solid metal resting on the floor, which resists all stresses resulting from the action of the cutters on the work. The cutter slide is actuated on the draw-cut principle and in conjunction with this style of bed assures a good example of the rigid anvil type of construction, and insures not only increased feed but great accuracy in the work. The portion of the bed supporting the upright cutter slide forms an integral part of the main bed casting, which further increases the rigidity of the entire machine. The machine has been designed primarily to obtain to the greatest extent possible the benefits to be derived from modern high speed steel cutters, and at the same time one which will turn out accurate racks.

The cutter slide is counter-balanced and is so arranged that it cannot feed down, unless the proper divisions and all previous movements have been completed. The cutter spindle is located approximately in the center of the slide and is provided with large bearing surfaces to insure freedom from chatter under the heaviest cuts. The cutter spindle is driven through double spiral gears, one pair being placed on the out-board end and the other pair close to the cutter, where the full driving effect can be obtained. The two pairs of spiral gears are cut right and left hand respectively to

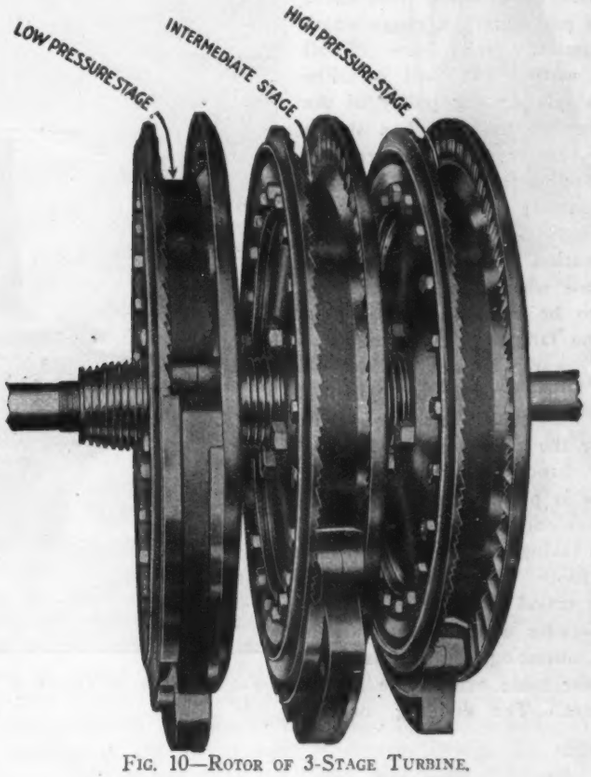


FIG. 10—ROTOR OF 3-STAGE TURBINE.

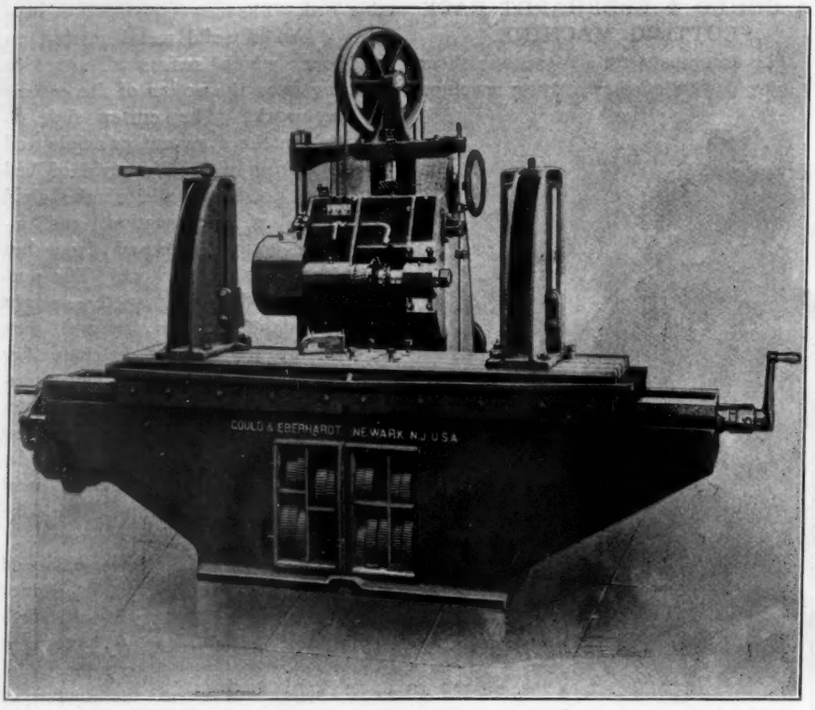


FIG. 1—FRONT ELEVATION OF NEW GOULD & EBERHARDT RACK CUTTING MACHINE.

neutralize all end thrust in the cutter spindle. The illustration, Fig. 1, shows the position of the spiral gear drive immediately adjacent to the cutter, the gear case having been removed.

The feed to the cutter slide ranges in geometrical progression from ¾ to 14½ inches per minute, a range which will economically take care of all classes of work. The feed is taken from the single driving pulley of the machine through the gear box shown in Fig. 2. Cutter speed changes are provided ranging from 12 to 72 revolutions per minute in geometrical progression.

An innovation embodied in this machine for use where there is a variety of work to be cut, as in a jobbing shop, is the fact that by changing a couple of gears, it can be set to divide for either circular or diametral pitch, or for metric circular pitch, while using the same lead or dividing screw. A hand adjustment for the table screw is provided which will be found convenient in setting work to be recut or in taking a light cut from one side of a tooth. The table is geared to use the travel movement in either direction, saving wear on the various parts and obviating the necessity of returning the table every time a new blank is set. The dividing, or advancement of the table for each tooth to be cut, is driven by a positive dividing mechanism. Adjustable stops are provided which will automatically throw the table feed out at any predetermined point.

The machine shown has a capacity for work up to 6 feet long at one setting. Longer lengths can be cut by shifting the blank after the first series of teeth have been cut. Any width of face can be cut up to 10 inches or a series of narrow faced racks can be held in the vises up to the full capacity of the machine.

Any pitch up to 1½ inches diametral in cast iron, or 2 pitch in steel, may be cut using one to 12 cutters, depending upon the pitch to be cut. It is possible to use a gang composed of one roughing and one finishing cutter at the maximum rated capacity of the machine. The gang cutters are used with the cutting points set spirally to avoid chatter and rapid wear of the cutter edges.

The chucks or vises for holding the rack blanks are rigidly held to the top of the table by means of bolts in T-slots. The vises are so designed that they can be fastened rigidly to the top of the table without springing the latter out of line. The table is provided with large bearing surfaces and strongly gibbed to the ways of the main bed casting. The blanks are held in a vertical position and consequently the cutter slide travel is

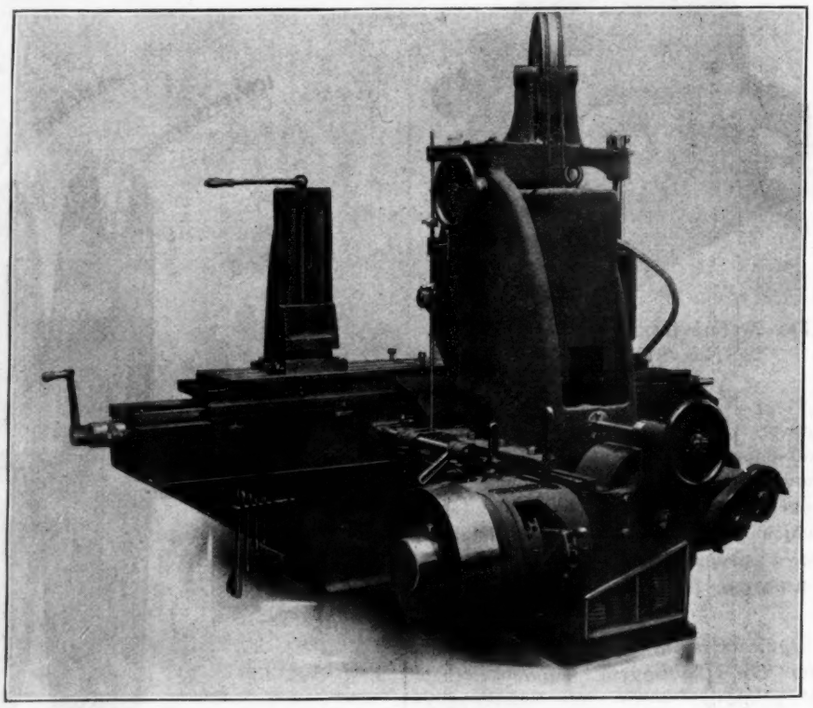


FIG. 2—REAR OF GOULD & EBERHARDT RACK CUTTING MACHINE, SHOWING GEAR BOX FOR FEED MECHANISM.

vertical. This permits the chips to drop out of the way of the cutter.

An opening in the bed of the machine enables chips and lubricant to be removed. The lubricant flows into a pocket which is cast in the bottom of the bed where a screen separates it from the chips. A second pocket is formed in the oil bed in which the lubricant rises and whence it is again pumped in the cutters.

In addition to cutting racks the machine can also be used for milling and facing off spots on castings and similar work which is generally done in a vertical milling machine. But one belt is required for driving, the various movements being transmitted through shafts, gears, etc. The machine may be driven by an individual constant speed electric motor if desired. The tool is manufactured in 6, 8 and 10-foot sizes.

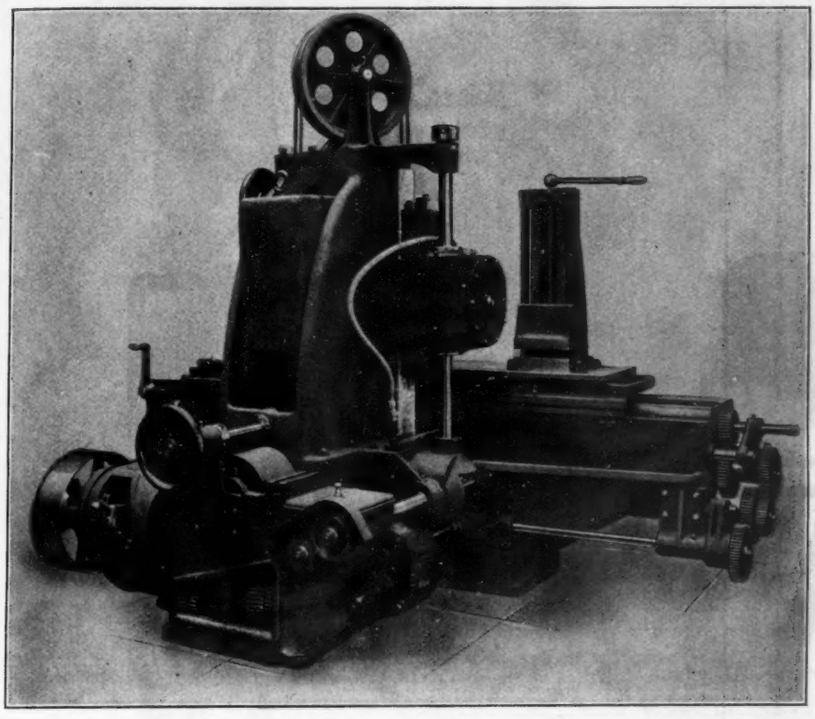


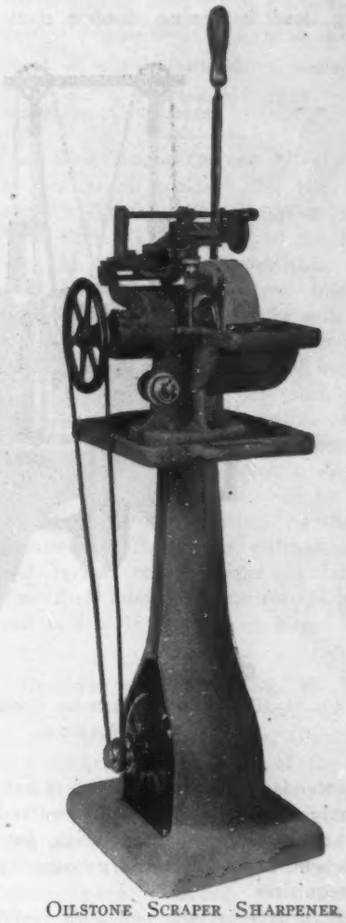
FIG. 3—REAR OF GOULD & EBERHARDT RACK CUTTER, SHOWING TRANSMISSION TO CUTTER SPINDLE AND TABLE FEED.

Takes Belgium Contract.—The National Fire Proofing Co., Pittsburg, has taken a large contract for the furnishing of the underground conduits for extensive government telephone and telegraph construction in Belgium. The construction of the lines involves the use of 50 pairs of cables or about 200 miles of wire.

A REVOLVING OIL STONE SCRAPER SHARPENER.

The accompanying illustration shows a machine designed for the purpose of properly sharpening machine scrapers. It is known as a revolving oil stone scraper sharpener, and is built by the Mummert, Wolf & Dixon Co., Hanover, Pa. The old method of sharpening scrapers was by rubbing them on an ordinary bench oil stone, an operation taking considerable time and which requires an experienced man to put them in proper shape. This machine is devised to put the scraper in shape quickly and in such a manner that the edge will be retained a much greater length of time than is possible with hand sharpening. The machine will grind the face straight or slightly convex, if so desired, always making two sharp cutting edges on the tool. For grinding the edge the scraper is held in a vise attached to compound slides, and by the use of a hand lever the vise and scraper are moved back and forth, as well as laterally across the face of the stone. With these two motions the scraper is moved over the entire surface of the stone and keeps it true. A small platform is provided which is always in line with the face of the wheel and parallel with the lines of motion of the two slides. In gripping the scraper in the vise, the latter is pushed over the platform, the scraper set on it and clamped and the vise is then slid forward until the scraper comes over the stone. The feed is regulated by an adjusting screw at the front of the machine.

Other purposes for which the machine can be used, is the sharpening of thread-cutting tools, or any other tools on which a keen, sharp edge is required. On this kind of work the scraper holding attachment can be turned back out of the way. The oil stone wheel is run in a kerosene bath and is driven through a set of spur gearing with a ratio of 2:1. The machine is driven by one-eighth horsepower motor taking current from a light circuit. The machine is portable and provided with two handles, by which it can be easily carried from place to place.



OILSTONE SCRAPER SHARPENER.

The Spring Green, Wyoming & Wisconsin Bridge Co., Spring Green, Wis., has been dissolved.

THE FRANKFORT COMBINATION HEATING FURNACE.

We illustrate herewith the Frankfort combination heating furnace made by Strong, Carlisle & Hammond, Cleveland. This furnace was originally designed for the treatment of high speed steel. It is arranged for either gas or fuel oil, and is a combined heating and smelting furnace. Within its capacity, its range of usefulness covers all the different purposes for which a furnace or forge may be used, as annealing, case hardening, welding, tempering, lead hardening, babbitt melting, etc. It has two ovens and is particularly adapted for tool room and shop use and for manufacturing purposes where variety and large capacity are requisites.

The furnace is equipped with seven burners, a positive pressure blower and an air reservoir. It may be built with an open oven or with a muffle. This latter form is seldom used, however, as the material in the open oven is protected from the direct action of the flames, and is always surrounded by a non-oxidizing atmosphere. The burners enter the combustion chamber beneath the heating oven and the heat from them is thrown against a baffle and the oven floor and thence through narrow openings at the side of the heating oven. The heat is thus applied evenly to all parts of the material and produces a uniform saturation at an exact temperature.

The furnace is equipped with Weintz natural gas burners which will produce an intense heat free from oxidizing properties. A temperature of 1400 degrees Fahr. can be obtained in 30 minutes from a cold furnace, and 2700 to 3000 degrees Fahr. in from 60 to 90 minutes. The valves which control the supply of fuel and air can be adjusted so that any temperature, up to the maximum, can be obtained at the will of the operator.

The large oven is equipped with five burners and consumes from 130 to 160 cubic feet of gas per hour. The small oven works independently of the larger and has one burner consuming about 50 cubic feet of gas per hour. The form of the small oven is the same as that of the large one and it is just as efficient and economical for light work and small jobs.

The melting or reducing pot is placed back of the small heating oven and is served with a single independent burner consuming about 30 cubic feet of gas per hour. The pot is of cast iron and of special design. Its capacity is about 100 pounds of lead or babbitt. Starting with a cold furnace, 10 minutes will suffice to fuse the metal. After the requisite temperature is attained, the gas and air supply can be regulated to maintain a uniform melting temperature. This feature eliminates any danger from an overflow and prevents burning of the metal.

All live heat is absorbed by the contents of the pot. The small amount of dead heat is carried off by a suitable vent provided for the purpose. Chimney connections are not required, except when large quantities of metals are fused. In such a case a hood and pipe are provided to collect the fumes and carry them to the chimney.

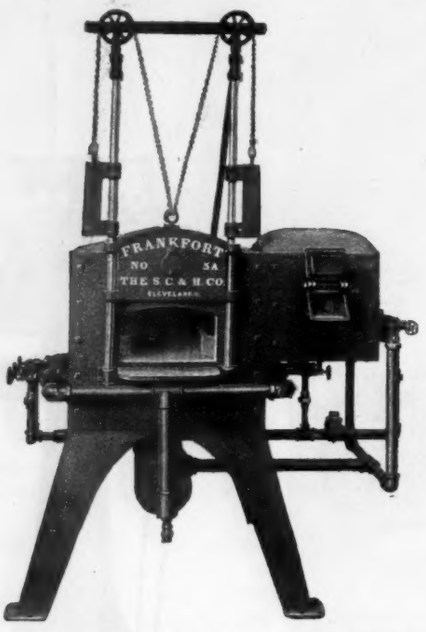


FIG. 1—FRONT OF FRANKFORT COMBINATION HEATING FURNACE.

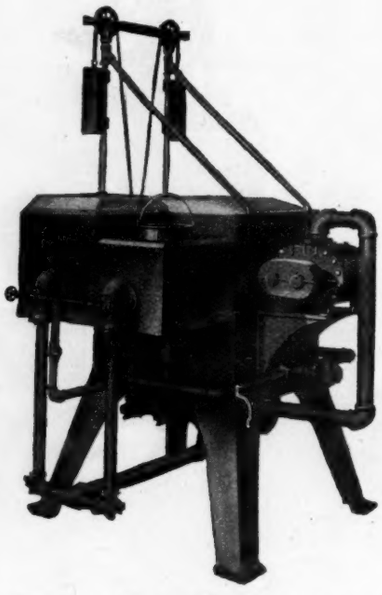


FIG. 2—BACK OF FRANKFORT COMBINATION HEATING FURNACE.

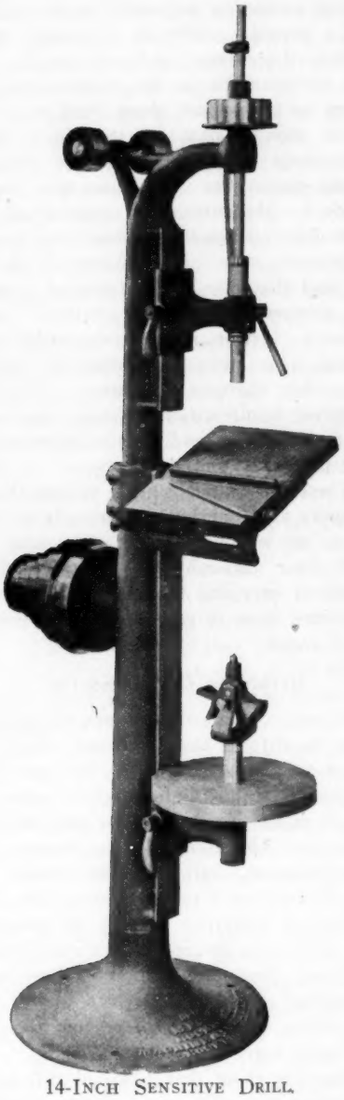
A 14-INCH SENSITIVE DRILL.

The accompanying view of the 14-inch sensitive drill and its attachments, built by the Rockford Machine & Shuttle Co., Rockford, Ill., illustrate a substantial tool with a well devised equipment for accurate drilling at any angle. The drill is of very simple construction and aside from the counterbalancing of the spindle by means of a weight inside the column, the tables and centering attachments are the novel features. A square and a round table are furnished with the tool, the former mounted on the column by means of a clamp which permits of it being swung around the column and out of the way. The round table is adjustable up and down on the column and is fastened in any one position by a simple lever clamp.

The square table may also be swung into any angle as shown in Fig. 1 and set there. The stop bracket is likewise adjustable and serves to support the piece being drilled at whatever angle it may be set. Another device for attachment to the square table is a centering jig which takes the place of a centering tool. The square table is swung over on the column and this centering device clamped on one edge of the table where it may be used to center and support a long

piece or may be used as a chuck for holding the work. It serves for both round and square stock. The centering jaws are actuated by a screw and handle as shown.

The round table is fitted with a combination one-piece center which embodies a point center, a cup center



14-INCH SENSITIVE DRILL.

and a crotch center. Each of these may be locked in a position for service by means of a pin key and the change from one to the other is made by simply rotating them on a small axial shaft.

The general dimensions of the tool are as follows: Distance of post to center of spindle, 7 inches; maximum distance from spindle to round table, 41 inches; travel of spindle, 3 inches; vertical adjustment of head, 7½ inches; diameter of spindle (in sleeve), ⅞ inch; hole in spindle, Morse taper, No. 1; driven pulleys on countershaft, 8 inches diameter, 2⅛-inch face; speed for countershaft, 450 revolutions per minute; floor space required, 22 x 28 inches; net weight with countershaft, 250 pounds.

A NEW RING GRINDER.

The accompanying illustration shows a ring grinder placed on the market by the Saxon Mfg. Co., Holyoke, Mass. This machine has ample weight to meet the requirements of any work within its capacity, which is an essential for the accuracy required in

THE SAXON RING GRINDER.

work of this character. The chuck of the machine is attached to the vertical spindle driven from the lower gear box, which will give eight speeds for work of varying diameters. It is elevated by a hand wheel graduated to read in one-thousands of an inch. The chuck regularly fitted to the machine is of the magnetic type and affords the quickest way of fastening the work and avoids any liability of springing it. A plain chuck is furnished for brass, copper, hard rubber or other non-magnetic material or if the magnetic chuck is not needed. This plain chuck has three or four jaws as desired.

The head which carries the wheel is adjustable so that the work may be ground thicker or thinner at the center than at the circumference. This is a necessity in grinding saws and cutters. The head is provided with three speeds, giving the necessary changes for roughing and finishing.

The spindle is provided with adjustable bushings thoroughly protecting it from rust and provided with adequate means for taking up the wear. The feed is automatic and can be operated by hand if necessary.

The machine is driven from the main line shaft and a countershaft is unnecessary. A direct current of from 110 to 220 volts supplies the necessary magnetizing current for the chuck. Connection can be made to a lamp socket. If direct current is not available, a small generator is furnished which can be placed in any convenient position, and the wires brought to the grinder. The following table shows the principal dimensions of the machine:

Diameter of magnetic chucks, 8¾, 10¾, 12¾ inches.
Size of grinding wheel, 8 x ¾ x 2 inches.
Height to center of spindle, 46 inches.
Greatest distance center of wheel to chuck, 12 inches.
Speed of driving shaft, 450 revolutions per minute.
Floor space, 26 x 45 inches.
Net weight, 1,300 pounds.

A New House Organ.—"Reactions," to be issued quarterly by the Goldschmidt Thermit Co., 90 West street, New York. The purpose of the magazine, as stated by the publisher, is to keep its customers regularly informed of the latest and best practice with thermit. It is also intended in the pages of the magazine to answer all inquiries in regard to thermit processes. The first number contains an article on rail welding, one of recent improvements in the thermit welding process, a synopsis of the important repairs made by thermit during 1907, an article on the application of thermit in railroad shops, and several other articles of interest. The first number comprises 24 pages and is 8 x 10¾ inches in size.

Removes to Parkersburg, W. Va.—President Edwin D. Bevitt, of the Scott Corrugated Roof Co., Cincinnati, has confirmed the report of the proposed removal of the company's plant to Parkersburg, W. Va. The old wire nail plant has been acquired and will be rebuilt, R. L. Brown, Parkersburg, having been awarded the contract. The machinery and equipment will be removed from Cincinnati. In announcing the change of location President Bevitt said that his company will thus be brought into closer touch with its supply of raw material which it takes from the Parkersburg Iron & Steel Co.

The Trenton, N. J., shops of the Pennsylvania Railroad Co. began March 23 on full time, 50 hours a week, with more than 700 men employed. For some months, the shops had been running only half time, or 24 hours a week. Announcement is made that more work will be sent to the Trenton shops in the future and that additional shops will be erected.

SATURNALIA OF VIOLENCE

Would Result From Proposed Bill, Declared Judge Speer—Severe Arraignment of Measures Now Pending in Congress—Demand for Calm Consideration of Very Important Problems

One of the most important features of the convention of the National Metal Trades Association held last week in New York was the address of Judge Wm. H. Speer, of New Jersey, on the subject presented at the banquet Wednesday night, "Some Dangerous Modern Tendencies." Judge Speer spoke without notes and with great earnestness and soon aroused his hearers to a high pitch of enthusiasm. His denunciation of the proposed amendment of the Sherman anti-trust act and of the bill relating to injunctions was received with hearty approval. Judge Speer said:

The topic which you have assigned to me is, "Some Dangerous Modern Tendencies." I have been some time now out of the active antagonistic practice of the law, and it is my supreme privilege to sit in judgment upon those who fight, and consequently whatever knack I may have ever possessed of polemic discourse, I have somewhat forgotten, and I am going to try and remind myself a little of it tonight.

The first modern tendency which I consider dangerous and to which I desire to direct your attention is the tendency to hasty and ill-advised legislation. There is now pending before the congress of the United States a bill to amend the Sherman anti-trust act in order that labor unions may be excepted from its provisions as organizations in restraint of trade. In this republican government of ours, there is only one kind of trade that it is not only lawful but even praiseworthy to conspire to restrain, and that is the trade between the labor union and the politician. The labor union leader approaches the politician, and, in consideration of votes which he cannot deliver or because of threats which he cannot carry out, he induces or compels the politician to give him something which is against the public good. And it seems to me that one of the especially valuable functions of an organization such as this is to see to it that bargaining of that kind shall not triumph in this country.

Publicity Not Sought.

We read in the daily papers that this amendment is being sought because it tends to publicity in the efforts of organization and also because it was brought about by a conference between the president of the United States, officers of the government and the National Civic Federation. But you men know that the primary object and motive of that legislation is not publicity at all, but the object is to relieve labor organizations from a restraint which the supreme court of the United States in promulgating an American doctrine has declared shall rest upon the shoulders of labor. You know and I know that it is pretty near election time. We know furthermore that no labor organization should be permitted to masquerade under the name and guise of the National Civic Federation for the purpose of obtaining license for itself to carry on practices that are un-American.

It seems to me that the primary object that organizations of this character should keep in view is to put their hand upon the public pulse, ascertain the public will, and translate that will into law, for in no other way can American principles predominate. For what is a law? A law is nothing else than the response of the legislature to the wants of the people: not 2½ per cent of the people, not 5 per cent of the people, but to the will of the majority of the people; and, therefore, any discrimination in favor of any class of citizens is reprehensible, un-American, and ought not to be translated into law.

A Dangerous Proposition.

Another effort that is being made is to so amend the injunction law that a hearing shall be had before a temporary restraining order shall be permitted to issue. I have had, I think, some 15 years' of experience, first as a practicing lawyer, afterwards as prosecutor of the pleas of my county, and now as judge; and I say to you that it is the result of my observation and experience that such a change will make for evil in this government. I say to you that "the very essence of preventive justice," which the injunction has been called by Lord Coke, is to apply a remedy to preserve the object of litigation until a hearing can be had. If you notify a labor organization or any other organization bent upon violence, crime and intimidation, if you give them notice that you are going to apply for a temporary restraining order, the interim betwen the notice and the granting of the order will be a saturnalia of violence. And, therefore, I say that such a practice ought not to be engrafted upon the jurisprudence of this country.

The injunction originated in the reign of a popular sovereign to protect the rights of common, ordinary people; it has outlasted the storms of hundreds of years in its present shape; and it is a queer manifestation of the times, but unforeseen consequences always follow social movements. The laws that were made for the purpose of stopping usury instead of relieving the debtor bore more vigorously upon his condition. And so we find that now in the times of greatest prosperity there are outcries and clamors against the present order of things. The more prosperous the times, the more vigorous the outcry. It is a perverse manifestation of social progress to find agitation and clamor accompanying prosperity and development.

Therefore we ought never to take these clamors and outcries too seriously at the time, but we ought to let them sink in and filter through and be thoroughly threshed over and thought over and determined upon in calmness before action shall ensue.

Return to Old Standards.

If any concrete illustrations are necessary to enforce that argument, we have them before us right now. We take the decisions of the United States supreme court in the North Carolina and Minnesota rate law cases; take the decision of the supreme court of Pennsylvania in the Pennsylvania rate law case; take the action of Governor Hughes in refusing to put a rate law upon the statute books without due consideration. Those are evidences of a healthy return to the old standards of looking before you leap and thinking before you act.

Another thing that I would call your attention to is this, as a concrete illustration of the same doctrine, and that is that in England they are rushing precipitately and headlong into a career of socialistic problems and doctrines. And what is the result? We pick up a paper and find that in a bye-election in Peckham the socialistic party has triumphed overwhelmingly; but there are indications of a return to sanity even there.

Time for Sober Thought.

Now these are matters that will bear thought, and these are matters that will bear thought also in high places. It is not the time for any politician to lend

himself to any doctrine inimical to the general welfare for a political purpose, it is not the time to do that; it is the time rather to determine upon sanity of thought and sanity of action. Why, in this contest that was waged in Peckham in this bye-election, the party that advocated the socialistic docrine went about trying to preach that, although their policies seemed to mean a certain thing, they did not mean what they seemed to mean, and although they seemed to tend towards a certain goal, they really would not reach that goal.

Now that is not the way that the generation that we are living in has been brought up to view public problems. There ought to be the most transparent candor in these matters and in putting public policies before the people; the people ought to be able to know what a law means before it is put to a vote.

To revert for an instant to this Sherman anti-trust amendment, the law was passed originally in such wise that some of the greatest statesmen we had said that no one then knew what the law meant, that the courts would have to construe it. And now what is the program? The program is to add to that inscrutable law a most marvelously obscure amendment, and no one can tell now whether that amendment will permit a labor union to carry on a boycott or not; and it is my judgment that probably it can. Therefore I say that laws ought not to be written in that way. Why, that is little short of the old Roman method of Caligula, who used to write his laws on little cards and hang them on high poles the better to ensnare the people. In one you read but you do not understand, and in the other you cannot read and therefore you cannot understand. But in the ultimate analysis the result is the same.

Let us then band ourselves together as American citizens, let us demand that the laws shall say what they mean and that the courts that expound them then shall not be decried but upheld; for the great foundation stone of this government from its inception to the present time has been the supreme court of the United States.

Let me say that where justice lies pleading because of the assaults, whether they are made intelligently or otherwise, of those who see fit for their own purposes to decry and declaim against them, the country is being shaken in its foundation stones. Therefore, let us march forward, let us march forward until we have seen to it that the representatives of the people represent the people, that the laws that we write upon the statute books represent the will of the people, and then the principles of Americanism will sleep secure beneath the tents of victory upon the heights of success. (Prolonged applause.)

QUANTITIES OF STEEL

Are Needed to Complete Great Building Construction in San Francisco.

(Special Correspondence.)

San Francisco, March 30.—San Francisco will build 33 new school houses as rapidly as the $5,000,000 bonds for that purpose can be converted into cash. The buildings include, besides a few 10-class room structures, several 12 and 16-class room houses, three high school buildings and an extensive addition to a fourth high school building. Several of the structures will be class A buildings, reinforced concrete, while others will be of brick and stone, and some built of wood. Iron and steel are among the minor materials used in the projected school houses, which had been voted for some two years ago.

Thirty-three school houses at a cost of $5,000,000 to be constructed at one time is insignificant as compared with building operations going on in San Francisco at present. Within one square block of Market and Kearny streets some five or six buildings are now in course of construction, the total cost of which will be more than twice the cost of all the school houses, and will require many thousands of tons of structural steel. The Palace hotel alone will require 12,000 tons of steel. There are fully 100 large buildings in course of construction in San Francisco, and it will tax the transportation companies to bring all the steel and iron needed from the east.

Western Electric's Report.—The first annual report made by the Western Electric Co. in pamphlet form has just been submitted to stockholders, it being for the year ending Nov. 30 last. The report shows net earnings on 1907 sales of $1,217,000. After 8 per cent dividends or $1,200,000 had been paid a balance to surplus of $17,000 was left. Sales for 1907 were $52,724,168 as compared with $39,245,332 for the year previous.

Company Reorganizes.—The E. G. Whitacre Boiler Co., Wellsville, O., which was recently purchased by Pittsburg and other capitalists, has been reorganized by the election of the following officers: President, I. N. DeNoon, Pittsburg; vice president, C. V. Shoub, Wellsville, O.; secretary and treasurer, W. C. Dellamyer, Wellsville. The directors include of the three officers, T. B. Wylie, Pittsburg; S. DeNoon and P. M. Smith, Wellsville, and Mr. Woliver, Smiths Ferry, Pa. The present name of the company will be retained, and it is the intention in the near future, to increase the plant's output of hot water and steam boilers, radiators and heating supplies. Considerable business in medium-sized contracts has been taken recently, including that for equipping a large telephone building at Rochester, Pa.

A LONG CAMPAIGN.

After having been run continuously on one lining for seven years, Eliza furnace No. 4 of the Jones & Laughlin Steel Co., is being repaired and rebuilt. During its operation with the one lining, the furnace turned out 1,202,056 tons of pig iron and if business conditions had warranted it, the statement is made by the furnace officials that this output might have been increased to 2,000,000 tons before the lining had reached such a state as to demand its being replaced. When removed, the lining was found to still be in a very serviceable condition.

The record made by the furnace is said to have been surpassed by only one other stack, Duquesne No. 1 of the Carnegie Steel Co., whose production on one lining, was about, 1,250,000 tons. The rebuilt Eliza No. 4 is expected to be ready to resume operations, about June 1.

Directors Seek to Operate.—Directors of the Licking Coal & Iron Co., Covington, Ky., have been endeavoring to arrange for rebuilding and operating the plant partly destroyed by fire and now in the hands of a receiver. J. C. Frederick and William Droege have petitioned the federal court at Covington to remove the receiver and direct the creditors to select two of their number to act as creditors' committee. They declare that in spite of flood and fire the company has made money and that the appointment of a receiver was unnecessary. The directors will meet again shortly to continue their planning.

Miss Nancy Roe, daughter of J. P. Roe, general superintendent of the Glasgow Iron & Steel Co., applied the torch that lighted the No. 1 furnace of the Warwick Iron & Steel Co., Pottstown, Pa., March 13, which was blown out Nov. 11. Little Miss Roe had officiated in the same capacity Aug. 3, 1905, the last time previously the stack had been blown in.

Industrials Reach Year's High Point

Hopeful signs were apparent mostly during the week. Industrial stocks were largely in the public eye, with the result that railroad and miscellaneous securities advanced also. Beginning Monday following favorable United States supreme court decisions, especially that one holding invalid the Minnesota railroad regulations, the market steadily rose until new high prices for the year were recorded. United States Steel preferred reached par, but later receded slightly. Other advances included: American Can preferred, 2⅛; Car & Foundry preferred, 2¾; Locomotive, 6⅛; General Electric, 5; New York Air Brake, 3⅝; United States Pipe, 5⅛; preferred, 2½; Railway Steel Spring, 3⅛. Thursday sagging was apparent, but Friday upon renewed activity prices stiffened and ruled higher until shortly before the market's close on Saturday noon, when stocks dropped from one to three points. The volume of trading compared favorably with that of the same week in other years. It was pointed out that much of it had a professional color, but also it may be recalled that the buying public, such as the market has been accustomed to in the recent boom years, has not been much in evi dence for the past two years. Westinghouse securities attracted attention, Air Brake gaining a point and Electric 13½, upon assurances that conditions favor proposed reorganization of at least one of the properties.

The advance in the selling price of copper, together with reports of large sales of electrical apparatus, brought copper stocks to an advance.

The prevailing low money rates were favorable to market transactions during the week. The Bank of England maintained the 3 per cent rate and there was some foreign participation in the American market. The New York bank statement fulfilled expecta tions. Cash and surplus reserves increased, the total surplus standing at $39,788,525, as compared with $13,131,275 a year ago. An increase in loans of moderate proportions was noted and also an increase of $7,254,100 in total deposits. The total number of shares dealt in was 4,673,350, compared with 3,936,460 last week and 5,922,850 for the same period one year ago. The sales of bonds, exclusive of government bonds, amounted to $17,990,000, as against $10,222,000 last week and $12,523,000 the same period one year ago.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Mar. 28	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	8¼	+ ¾	Sept. 3	19,820 000			
Allis-Chalmers pr	20	− ⅛		16 150.000	7 cum	1¾ Q.	Feb., 1904
American Can	4⅞	+ ⅛	Feb. 3	41 233 300			
Am. Can pr	50	+2⅛		41.233.300	7 cum	1¾ Q.	April, 1903
Am. Car & Foundry	32½	+1½	June 25	30,000,000		1 Q.	April, 1908
Am. Car & Fdy. pr	93	+2¾		30 000.000	7 n. c	1¾ Q.	April, 1903
American Loc.	45¼	+6⅜	Oct. 20	25,000.000	5	1¼ Q.	Feb., 1903
American Loc. pr	94	+2		25 000.000	7 cum	1¾ Q.	Jan., 1908
American Ship	41¼	−1¼	Oct. 14	7 60 000	4	1	Mar., 1908
American Ship pr	94	− ½		7,900,000	7 n c	1¾ Q.	April, 1908
Am. Steel Foundries	5⅞	+ ⅜	Oct. 6	15 810 000			
Am. Steel Foundries pr	30½	−1⅝		17,240.000	6 cum	2½	Aug., 1804
Barney & Smith	50	.....	June 2	2 000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	90	.....		2 500 000	8 cum	2 Q.	Mar., 1908
Bethlehem Steel	13½	+1½	Apr.l 7	14,862,000			
Bethlehem Steel pr	35½	− ½		14 968 000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	29½	.....	March 17	45,000 000*	6	1½ S. A.	Feb., 1904
Cambria Iron	45¾	.....		8,468.000*	4	2 S. A.	April, 1908
Chicago Pneumatic Tool	24⅞	+2¾	Feb. 17	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	22¾	+ ⅞	Oct. 19	34 235 500		1¾	April, 1902
Crucible Steel	5¼	+ ¼	Oct. 21	24 578 400			
Crucible Steel pr	37½	+1		24,436.500	7 cum	1 Q.	Dec., 1907
Empire Steel	5	− 3	Feb. 26	2, 81.400			
Empire Steel pr	45	+5		2 500,000	6 cum	3 S. A.	Jan , 1907
Fay & Egan	100	.....	Feb. 18	1,000,000	6	1½ Q.	July, 1907
Fay & Egan pr	110	.....		1,000 000	7 cum	1¾ Q.	Aug., 1907
General Electric	127	+5	May 12	65,167,400	8	2 Q.	April, 1908
Harbison-Walker	10	.....	Jan. 20	18,000.000		½	Oct., 1907
Harbison-Walker pr	68	.....		9,6 0.000	6 cum	1½ Q	Oct., 1907
International Pump	22½	−⅜	June 2	17.787 300		1	April, 1905
International Pump pr	71¾	.....		13,835,000	6 cum	1½ Q.	Feb , 1908
Lackawanna Steel	28	.....	March 11	34,971 400			
Lake Sup. Corp	6¾	.....	Oct. 7	40,000.000			
New York Air Brake	69½	+3½	June 18	8 012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	120	.....	Feb. 5	8.500 000	6	1½ Q.	Mar , 1908
Niles-Bement-Pond pr	100	.....		2 000,000	6 cum	1½ Q.	Feb., 1908
Otis Elevator Co.	32	+3	March 16	6 156.600		1½ S. A.	April, 1908
Otis Elevator Co. pr	85	+7		5 449.500	6 n. c	1½ Q	April, 1908
Penn. Steel	69	− 1	May 11	10.750 000			
Penn. Steel pr	90	.....		16 5 0 000	7 n. c.	3½ S. A.	Nov., 1907
Pittsburg Coal Co.	9¾	- ¾	Feb. 10	28,297.600			Nov., 1906
Pittsburg Coal Co. pr	41	+1½		27,246.800	7 c.	1¾	April, 1905
Pressed Steel Car	24½	+2	Feb. 19	12,500, 00		3	Aug., 1904
Pressed Steel Car pr	80	+ ½		12.500.000	7 n. c.	1¾ Q.	Feb., 1908
Pullman	153¼	+2⅞	Nov. 11	100 000 000	8	2 Q.	Feb., 1908
Railway Stl. Spring	36¼	+3½	March 5	13,500.000	4	2 S. A.	April, 1908
Railway Stl Spring pr	75½	.....		13,500 300	7 cum	1¾ Q.	Mar., 1908
Rep. Iron & Steel	19⅝	+1⅜	Oct. 21	27,191.000			
Rep. Iron & Steel pr	73	+ ⅝		20,416 900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	49⅞	− ⅛	March 11	10.000.000	5	1¼ Q	Mar . 1908
Sloss-Sheffield pr	91¾	.....		6,700 0 0	7 n. c.	1¾ Q.	April, 1908
U. S Pipe & Fdy	26½	+5½	June 24	12.500.000	4	1 Q.	Dec , 1907
U. S. Pipe & Fdy pr	70	+2¼		12 500,000	7 n. c	1¾ Q.	Mar., 1908
U. S Steel	34¼	+ ⅜	April 20	508,302,500	2 n. c.	½ Q.	Mar., 1908
U. S. Steel pr	98⅝	+ ⅛		360,281,100	7 cum	1¾ Q.	Feb., 1908
U. S. Steel 5's	94½	+ ⅜		463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	50½	+ ¼	Nov. 17	9.073.680			
Westinghouse Elec	53½	+13¾	June 24	23 933 200*	10	2½ Q.	Oct , 1907
Westinghouse Air Brake	95	+1	Oct. 6	11.000,000*		2½ Q.	April, 1908

Par value of shares, $ 00, except those starred (*), $50.

Copper Market.

Boston.—North Butte Mining closed 56, a net gain of 2¼; Quincy Mining closed 85, a net gain of ¼; Butte Coalition closed 22¼, a net gain of 2⅛; Calumet & Arizona closed 104, no change, and Calumet and Hecla 640, no change.

New York.—Amalgamated Copper closed 60¾, a net gain of 3⅜.

Financial Notes.

The directors of the Calumet & Arizona Mining Co. declared the quarterly dividend of $1 a share, which was due for declaration in February, but deferred a month; the American Locomotive Co., regular quarterly dividend of 1¾ per cent on the preferred payable April 21, and 1¼ per cent on its common stock, payable May 27; the Chapman Valve Co., quarterly dividend of 1 per cent; American Ship Building Co., regular quarterly divistock, payable April 15. The common dividends of the Harbison-Walker Refractories Co. have been suspended after a single payment of one-half of 1 per cent.

J. A. Clark, assistant to the vice president of the Securities Corporation, Ltd., New York, who is now in Mexico, is authority for the statement that the corporation is in the market for 100,000 tons of machinery to be installed at the mines in the La Lux district, state of Guanajuato. Part of the machinery will be erected into the 1,000 stamp mill at La Luz. The mill is estimated to cost $2,000,000 gold.

NEWS FROM MANY INDUSTRIES

New Buyers:—

Samuel G. Smith, Lillie Smith and Mitchel W. Glenn, Manitowoc, Wis., have incorporated the Manitowoc Foundry & Machine Co., capitalized at $30,000.

Richard F. Tully, Franklin Vreeland and Cornelius A. Cole have incorporated the Lackawanna Foundries, Jersey City, with $200,000 capital.

Albert H. Sears, J. M. Sears and C. A. Darnell, Plano, Ill., have incorporated the Sears Mfg. Co. to manufacture machine tools and implements, with a capital of $250,000.

The Wirthlin-Scallan Co., Cincinnati, mechanical supplies, has been chartered by George R. Scallan, Joseph A. Scallan, Louis A. Wirthlin, Edwin M. Wirthlin and W. A. Geoghegan. Capital, $20,000.

The Royal Foundry & Machine Co., Canton, O., capitalized at $15,000, has filed articles of incorporation through Paul Browsky, W. J. Putnam, G. P. Browsky, George F. Edel and A. P. Maurer.

The Maxwell-Briscoe Export Co., Jersey City, N. J., motor vehicles, engines, machinery, etc., has been chartered by Benjamin Briscoe, John R. Turner and Richard Irvin. Capital stock, $50,000.

The Railroad & Car Material Co., Inc., Camden, N. J., to manufacture railroad cars, mining, lumber, coal, ore, etc., with a capital of $100,000, has these incorporators: C. W. Cantrell, J. W. Scull and N. A. Henry, Camden, N. J.

A charter has been granted to the Almstead Mfg. Co., Rochester, N. Y., to manufacture electrical apparatus and supplies, with a capital of $30,000. The incorporators are Raymond P. Almstead, Morris J. Almstead and John A. Almstead.

The Ajax Chemical Co., St. Louis, Mo., to manufacture and deal in boiler compounds and engine room supplies, has the following incorporators: William J. Castanie, Nathaniel L. McGuire and Otto A. Meltzow. Capital stock, fully paid, $50,000.

The Williams Stove Lining Co., Taunton, Mass., has applied for a charter to manufacture stove linings, with a capital of $25,000. The officers are: President, Joseph S. Williams; treasurer and clerk, John G. Williams; both of Taunton.

The Southern Structural Steel Co., San Antonio, Tex., has been incorporated with $100,000 capital by B. F. Youngblood, G. L. Youngblood and W. M. Cornett, to manufacture structural steel and iron.

The B. Shragee Iron & Metal Co., Ltd., Winnipeg, Man., has been granted letters patent of incorporation with $50,000 capital. The head office of the company will be located at Winnipeg.

The Berry Range & Mfg. Co., Springfield, Mo., with a capital of $50,000, has been incorporated by D. B. Berry, F. X. Heer and A. J. Eisenmayer. The company will manufacture stoves and do a general foundry business.

The Riverdale Iron & Steel Co., 13720 Indiana avenue, Chicago, has been incorporated by M. P. Cooper, Edmund Fordtran and George C. Clapper, to manufacture iron and steel commodities with $25,000 capital.

The General Railway Supply Co., 153 La Salle street, Chicago, for the manufacture of machinery and mechanical devices, has been incorporated with $30,000 capital by John M. Blakely, Harry U. Morton, William J. Gray.

Oltmans, Schmidt & Co., 107 South Adams street, Peoria, Ill., has filed articles of incorporation through Herman Oltmans, Charles J. Schmidt and Antonio F. Voilker. The new company will deal in iron and wire, and has a capital of $7,500.

The Chromographic Enameling Co., 153 La Salle street, Chicago, has been chartered by Henry W. J. MacNaught, James D. Crichton and Ernest Peacock. The company was organized to manufacture enameled metal articles, and is capitalized at $20,000.

The Rapid Molding Device Co., Buffalo, to engage in the manufacture of molding machines, has been incorporated with $100,000 capital. Those interested are Maulsby Kimball, Clifford E. Branch and E. C. Shafer, all of Buffalo.

The B. M. Shanley Jr. Co., Newark, N. J., to manufacture metal articles, with a capital of $100,000, has filed articles of incorporation through Barnard M. Shanley Jr., 993 Broad street; Thomas F. Pryor Jr., 473 Washington street, and Joseph V. Clark, 62 Verona avenue, Newark, N. J.

Articles of incorporation have been filed by the Universal Stamping Machine Co., Hopatcong, N. J., to manufacture stamping, printing, embossing and counting machines, etc., capital $100,000. Those interested are: Hudson Maxim and Lillian Maxim, Landing, N. J., and George H. Graham, 537 Palisade avenue, Jersey City.

The Van Manufacturing Co., Argos, Ind., has been incorporated by David C. Knott, Edwin J. Grant, John Franklin Behmer, Clarence J. Bair, Charles M. Sarber, Alonzo A. Schoonover and David E. Van Vactor. The company is capitalized at $50,000 and will manufacture farm machinery.

The Empire Voting Machine Co., Rochester, N. Y., has been incorporated by Gustave Erbe, Carl L. Lamb and Daniel B. Platt, of Rochester, N. Y., John Condon, of Chicago, and Adam Andrew, of San Francisco, for the manufacture of voting machines, with a capital of $2,000,000.

The Pribnow Swage & Tool Co., Mellen, Wis., announces that it is in the market for a 12-inch screw machine, a 14-inch high speed universal turret lathe, an 18-inch high speed lathe, a small milling machine, a disk grinder, an 8-foot planer, a 20-inch drill press, all the machines to be motor driven.

The Tostevin & Cottie Mfg. Co., Brooklyn, N. Y., has been incorporated with a capital of $20,000, to manufacture round belt coupling and sheet metal goods. The incorporators are F. W. Mills, 154 Nassau street; Fred Knowlton, 638 133d street; H. M. Browne, 422 St. Nicholas avenue, all of New York City.

The D. H. C. Co., New York, machinery, tools, etc., has been incorporated with $200,000 capital stock, by the following, all of New York City; Nathaniel Higgins, 2 West Eighty-sixth street; William B. Clafflin, 27 East Twenty-second street; Edward M. Dalley, 12 Duane street, and Lawrence C. Dalley, 38 West Forty-third street.

Mayor Joseph J. Moser, of West Covington, Ky., and his brothers, William and George Moser, have organized the Moser Bros. Co. and applied for a charter. The company is capitalized at $10,000, and will manufacture metal dies, iron and steel tools, machinery and metal stamp goods. A plant at Second and Greenup streets has already been started.

The incorporation of the Stanley Hoisting Co., New York City, to manufacture appliances for elevating building material in construction work, with a capital of $5,000, has been effected by Edmund S. Ashworth, Hasbrouck Heights, N. J.; William S. Ashworth, 368 East 146th street, New

York; Edward W. Curley, 260 Brook avenue, The Bronx, and others.

The Chester Railway Supply Co., Chester, Pa., has been incorporated with $50,000 capital. The officers of the company are: President, Elwood Tyson; secretary and treasurer, William A. Dyer; and manager, Harry G. Dyer. The new company has headquarters in the Law building, and will place on the market electrical devices, including a contrivance for holding the trolley wire, invented by Manager Dyer.

New Construction:—

The National Compressed Air Power Co., Montgomery, Ala., has prepared plans to erect a two-story brick building and install machinery costing $20,000, for constructing compressed air engines for power purposes.

The Warren Machine & Foundry Works Co., Warren, Minn., has commenced the erection of an addition to the shops in order to be in position to care for steadily increasing business.

J. A. Cruikshank of the Waterloo Fence Co., Waterloo, Ia., is placing machinery in the new plant and expects shortly to occupy four floors of a carriage factory which is being vacated by present occupants and rebuilt.

The Foundry Investment Co., St. Louis, has awarded to the Reinschmidt-Haenni Construction Co. the contract for erecting an addition to the factory and warehouse of the company at an estimated cost of $40,000.

The Louisville Car Wheel Co., Louisville, Ky., has complete arrangements for constructing a new plant of brick. Buildings formerly occupied by the Louisville Steel Forge Co., together with six acres of land, have been taken over by the car wheel company.

Vice President Sims of the Delaware & Hudson Railroad Co. announces that plans have been drawn for a large machine shop at Watervliet, N. Y. The company has requested the town authorities of Watervliet to close certain streets and open others, pending which negotiations the company is waiting before announcing definitely its plans.

The Coatesville Foundry & Machine Co., Coatesville, Pa., which has purchased a tract of land just outside the city, has let the contract to the McClintic-Marshall Construction Co. for constructing buildings on the site. They will be of structural steel, including a main building 114 x 208 feet, a fireproof pattern shop 40 x 60 feet, etc. They will be equipped for the manufacture of boiler fronts and other castings, such as grate bars. The company expects to have the plant ready for operation in August.

The Osborn Engineering Co., Cleveland, consulting engineers, has awarded contracts for the foundry building and equipment of the Bay View Foundry Co., Sandusky, O., as follows: General contract, including building complete, to G. W. Doerzbach & Bro.; cupola, crane, hoist and tumbling barrels to Northern Engineering Works, Detroit; generator to the Westinghouse Electric & Mfg. Co., Pittsburg; compressor, to the Bury Compressor Co., Erie, Pa.; blower, grinders, and other machinery, to the Central Foundry & Supply Co., Columbus.

General Industrial:—

The Vulcan Iron Works Co., Toledo, O., has increased its capital stock from $75,000 to $525,000.

The Summit Foundry Co., Geneva, N. Y., advises that the recent fire at its plant was small and did little actual damage.

The Davenport Machine & Foundry Co. has established an Illinois branch at Rock Island, to sell machinery and to do factory work.

The Automatic Boiler Cleaner Co., Logansport, Ind., recently incorporated, is having its work done in a contract shop. Its product is covered by patents.

Following the destruction of their foundry and machine shop by fire at Burlington, Kas., Reams & Son announce that they have withdrawn from business.

The National Mill Supply Co., Fort Wayne, Ind., has given notice of the increase of its capital stock from $15,000 to $50,000.

Among the increases of capital recorded at Harrisburg, Pa., was that of the Westinghouse Air Brake Co., from $11,000,000 to $14,000,000.

The Knupp machine shop, Farmer City, Ill., has been sold to Lively & Ross, Foosland, Ill. The plant will be opened the first of the month.

The Halcomb Steel Co., Syracuse, N. Y., which in January increased its capital stock from $1,200,000 to $1,500,000, recently made a further increase to $1,750,000.

The Yale & Towne Co., Stamford, Conn., has incorporated in West Virginia with a capital stock of $10,000, to manufacture locks, safes and other hardware in West Virginia.

The Automatic Specialty Co., Cincinnati, recently incorporated, is now transacting and continuing the business under the name of the Printing Machinery Co. The management of the new company will be practically the same as the old.

The American Machinery Co., Atlanta, Ga., announces that it will use its present plant to make and handle wood working machinery and deal in engines, boilers, gasoline engines, road machinery, etc.

The contract for a three-story factory of reinforced concrete, to cost $50,000, has been let by the Foote Bros. Gear & Machine Co., Chicago. The new building will be located at Nos. 44 to 50 North Carpenter street.

E. J. Job, Niles, O., has announced that he has leased the Ashland, Ky., sheet and steel mill and will commence operations April 1. The plant has been closed down for a year.

The Colorado Fuel & Iron Co. announces that the coal washer, mine tipple, engine house and laboratory recently destroyed by fire at Sopris, Colo., entailing a loss of $75,000, will be rebuilt within a short time.

The Milwaukee Stove & Foundry Co., Milwaukee, has filed an amendment to its incorporation papers changing its name to the Milwaukee Stove Works, and increasing its capital from $25,000 to $75,000.

The Detroit Copper & Brass Rolling Mills, Detroit, has filed notice of an increase of its capital stock from $1,000,000 to $1,500,000. The capital stock will now consist of 60,000 shares of the par value of $25 each.

Oliver H. Lau and H. Lindale Smith, receivers of the Norwalk Steel & Iron Co., and the William Kavanaugh Co., Norwalk, O., have filed notice to all creditors having labor or wage claims to file them at once so that provision can be made for their payment.

At the annual meeting of the Temple Iron Co., Reading, Pa., March 21, the following officers were elected: President, George F. Baer; vice president, A. F. Law; who with the following constitute the board of directors: J. S. Harris, E. B. Thomas, F. D. Underwood, Albert Broden, W. H. Truesdale, Thomas P. Flower, F. C. Smink and W. J. Richards.

Under a trustee's sale in bankruptcy the real estate, machinery and stock of the North Penn Iron Co., Philadelphia, was recently sold. The property was bid in by representatives of the company for $35,100, or $10,100 more than the mortgage subject to confirmation by the referee. The machinery and stock were sold by catalog in 725 different lots.

The stove plant of the Wehrle Co.,

Newark, O., has recently installed a three-motor electric traveling crane of about 50-foot span. The crane is to be used in their storage warehouse and this is one of the first stove plants which has made use of electric cranes for handling finished product. This crane is of special design and was built by the Northern Engineering Works, Detroit, Mich.

The Stewart Wrench & Pipe Co., Schenectady, N. Y., whose incorporation was recently noted, is having its manufacturing done by contract, but within a few weeks expects to get its shop at Albany, N. Y., equipped with modern facilities for turning out its product. The company is manufacturing a newly patented pipe wrench in three styles and three sizes and also four sizes of monkey wrenches.

The Nashville Foundry Co., Nashville, Tenn., has laid the foundation and begun the superstructure of a $2,500 brick foundry building. The structure will be 96 x 130 feet and will be equipped with modern machinery. J. W. Satterwhite is president, O. H. Looney, secretary and treasurer, and W. R. Wilhite, general manager. They, with L. E. Jones, constitute the board of directors. The new building will be ready for occupancy May 1.

The Pribnow Swage & Tool Co., Mellen, Wis., whose increase of capital stock was recently noted, has leased 2,500 square feet of floor space of the Mellen Water & Light Co., and has made a contract for additional buildings to be erected and furnished with power, light, heat and water. The increase of capital was made necessary by the expansion. The company announces that while it is working but 10 men yet it has work enough in sight for 50.

Gohmann Bros. & Kahler Co., New Albany, Ind., has increased its capital to $75,000, from $25,000, for the purpose of increasing the capacity of its stove and iron hollow ware pant.

Frank P. McDermott, Jersey City, has been named permanent receiver of the A. A. Griffing Iron Co., with a plant at Lafayette, N. J. The liabilities include $200,000 in mortgages and liens and $200,000 in other debts and claims. The New Jersey Title Guarantee & Trust Co. has started proceedings to foreclose a mortgage of $150,000 on the company's plant and patents.

The Sioux City Iron Co., Sioux City, Ia., wholesaler of heavy hardware, announces that it has arranged for temporary quarters in another building, following the destruction of its warehouse by fire. The company occupied this warehouse on lease, and no statement has yet been made as to the owner's intention of rebuilding.

The Penokee Iron Co., Iron Mountain, Menominee range, Wis., has filed articles of incorporation. The capital stock is $100,000, of which $5,000 is represented by property in business in Wisconsin. The Pitt Iron Co., also of Iron Mountain, has filed articles of incorporation under the same conditions.

The South Chester Tube Co., South Chester, Pa., has received a contract for supplying 50 miles of 8-inch pipe to connect the Texarkana oil field with Gulf port, at Shreveport, La. The contract is one of the largest ever awarded the tube company, and it is understood that the work of manufacture of the pipe will begin at once.

O. N. Richardson has purchased the High Point Machine Works, High Point, N. C. In 1889 he incorporated the works with $3,000 capital, and in a few years built a brick plant, foundry, etc. About a year ago he sold the machine works, after having organized the High Point Pipe & Foundry Co., and engaged in other business lines. However, he has recently again taken over the machine works, but has not decided just when the plant will resume.

The Bucyrus Iron Works, Bucyrus, O., was recently adjudged bankrupt in the federal court at Cleveland, and the case has been referred to Referee Wallace L. Monnett, at Bucyrus. Receiver McCullough is still in charge of the plant. The liabilities of the company will reach $11,000, but since a majority of the creditors have agreed to the company's proposition to pay 10 per cent on preferred claims, it is believed that the company will resume business shortly.

The Leader Iron Works, Decatur, Ill., intaller of water supply systems, says that its increased capitalization recently noted, was made necessary by the investment of more money in securing and handling business. The company has made increased improvements, and it believes it has a present capacity to properly care for this year's business.

An action was brought by the stockholders of the Precision Machine Tool & Development Co., Cincinnati, in common pleas court, for the appointment of a receiver, and Frederick Wagner, treasurer of the company, was named by Judge Woodmansee to take charge of the company's affairs. James Guilbert, a stockholder, through whom the action was brought, charged that the company is financially embarrassed because of the recent financial trouble, and in danger of becoming more so by the pressure of creditors unless the court took charge.

The Detroit Steel Products Co., Detroit, has closed a contract by which it has secured the American rights to manufacture and sell the Fennestra rolled steel window sash. The manufacture of this sash has reached large proportions in England and on the continent. It seems especially suited for wareouse and factory types of construction. The special tools and machinery to be used in constructing the sash are now on the way from England and will be installed in a specially erected building in connection with the Detroit Company's new plant. The officers of the Detroit Steel Products Co. are: President, Walter S. Russell; vice president, John H. Avery; treasurer, John G. Rumney, and secretary, John W. Dakin.

The Twin City Foundrymen, Minneapolis, Minn., at their recent annual banquet, passed resolutions protesting against the Gardner eight-hour labor bill now before congress. Speakers at the banquet deplored the fact that labor unions were exerting such an influence in politics. J. L. Record was toastmaster. The association reelected its old officers as follows: President, C. M. Power, St. Paul, Minn.; vice president, C. L. Menzel, Minneapolis, Minn.; secretary-treasurer, H. A. Rogers, Minneapolis, Minn. Executive committtee: C. L. Menzel, J. W. Bryant, E. S. Coffin, Minneapolis; C. M. Powell, Oliver Crosby and A. J. Brawley, St. Paul, Minn.

The Greensboro Boiler & Machine Co., Greensboro, N. C., has increased its capital stock to $200,000.

Trade Notes.—

The Standard Bridge Tool Co., Pittsburg, consulting, mechanical and contracting engineer, has leased larger quarters in the Curry building, owing to its constantly increasing business. The Standard company has been located in the Bissell building.

Fires.—

The Mill City Brass & Babbit Co.'s foundry at Minneapolis, was damaged to the extent of probably $1,000 by fire March 17.

The Penn Spring Works, Baldwinsville, N. Y., was seriously damaged by fire March 22. The loss is estimated at from $75,000 to $100,000. The company's officers announce that they will rebuild at once.

TRADE PUBLICATIONS.

WATER-JET EDUCTORS—The Schutte & Koerting Co., Philadelphia, is sending out a sectional catalog, relating to water-jet eductors extensively used in connection with city water pressure for drainage. Illustrations showing the eductors installed for various purposes are given, also price lists and tables of capacities of the different types. The Koerting automatic universal water-jet eductor, water economizer for fountains, water-jet sand washing plants, water-jet ash conveyor, etc., are described and illustrated.

GAGES AND VALVES — The American Steam Gage & Valve Mfg. Co., Boston. 1908 catalog. 246 pages. Bound in buckram, on the subject of gages and valves, presenting general information, instructions for using and attaching, directions for ordering, etc. Numerous types of valves, gages (pressure recording and combined pressure and recording gages being specialized), indicators, pyrometers, etc., are illustrated and described. Tables of dimensions and price lists are also included in the catalog. The book is well indexed.

SCREW-MAKING—The Union Steel Screw Co., Cleveland, is issuing a catalog presenting price lists and illustrations of wood screws, including steel, brass and bronze screws in all styles, sizes and finishes, coach and lag screws, carriage and machine bolts, standard and special rivets, etc.

VISES.—The Rock Island Tool Co., Rock Island, Ill. Catalog D. Thirty-seven pages. The above company, manufacturer of vises for machinists, blacksmiths, steam fitters, electricians, car builders, locomotive works, etc., in this catalog describes with numerous illustrations a large number of the various types, including the Rock Island automatic swivel type, automatic swivel type with self-adjusting jaw, the automatic universal swivel type, the stationary type, the stationary type with self-adjusting jaw, diamond swivel type, diamond stationary type, automatic swivel pipe vise, automatic three-way pipe vise and numerous others. Specifications, capacities and price lists are also given.

MINE EQUIPMENT.—The Christian Co., Massillon, O. Catalog. Eighty-one pages. Six by nine inches. Describes the special features and advantages of the drilling machinery and mine equipment manufactured by the above company. All the tools, equipment, machinery, supplies, fixtures, etc., furnished with the various types of drilling machines are listed and price lists are presented. The catalog also calls attention to the design and construction of vertical or upright steel boilers with submerged tubes, casing elevators, boilers, shovels, water hose and numerous other articles, together with a number of illustrations of the different types.

COUPLERS.—The Washburn Steel Castings & Coupler Co., Minneapolis. Catalog presenting information relative to the Washburn couplers and kindred devices. The couplers illustrated and described include flexible head passenger couplers of various types, compound or switch engine couplers, flexible head engine and tender couplers, flexible head box pilot couplers, etc. Steel buffer beams for locomotives with flexible couplers pivoted in body, with simple flexible couplers and with couplers and friction draft rigging telescoped through it. Narrow and broad gage combination couplers, friction draft rigging, platform and draft attachment for passenger cars, spring dampeners, all classes of steel castings, etc., are also described and illustrated.

GRAPHITE PRODUCTIONS. — Pettinos Brothers, Bethlehem, Pa., in a recently issued catalog presents a general description of their most important graphite productions, embracing those made from American, Ceylon, German and Mexican graphite and gives a table showing the world's production of graphite by countries from 1896 to 1903; also crucible table for sizes and capacities. Standard plumbago facings of various types are described, also standard core wash or blacking, standard stove plate facings and other facings. Ceylon plumbago, American flake graphite, American lubricating flake, crucible mixture cement, pipe joint compound, Mexican graphite, graphite for stove polish, Austrian graphite, etc.

FEED-WATER HEATERS.—The Harrison Safety Boiler Works, Philadelphia, in a circular just issued entitled "Where Water and Fuel Are Scarce or Dear" treats of the heating and purifying of boiler feed water in mining and smelting plants and shows the great saving in coal consumption by the use of the Cochrane feed-water heater, as well as a nearly equal proportion of raw water; also that, with the use of the above heater and six boilers, more steam can be made, while requiring less fuel, less labor and less water, than seven without one heater.

OIL FIRING—The Schutte & Koerting Co., Philadelphia, is issuing a sectional catalog on the subject of oil firing. Part I is devoted to the Koerting patent oil-firing system with centrifugal spray nozzles for marine or stationary boilers and locomotives. A description of the system is given, its application, low cost of operating and the various parts of the pumping outfit detailed and the construction of the centrifugal spray nozzles for oil firing shown, the proper means to carry the air to the liquid fuel being through air admission registers. Part II relates to steam-jet oil burners, their adaptation, working and manipulation being described. An illustration of the installation of these burners for burning tar is given; also a price list.

STEEL UNDERFRAMES.—The Ralston Steel Car Co., Columbus, O., is issuing a catalog relating to its steel underframes designed with a view of supplying a practical method of strengthening cars of wooden construction, embodying strength, simplicity and cheapness of maintenance. The illustrations show underframes as designed for refrigerator cars, gondolas, etc.

COKE DRAWING AND LOADING MACHINES.—The Covington Machine Co., Covington, Va., is sending out a catalog describing and illustrating the Covington coke drawing and loading machine. Its operations, power and adaptability are outlined and statistics showing the saving effected by the use of the machine are given. The illustrations show the machine loading coke at various plants.

MIXERS.—The Svenson-Shuman Machine Co., Pittsburg, is sending out a catalog relating to the Svenson mixer. The description contained in the catalog outlines the many advantages of the mixer and facts of importance to contractors, engineers and architects. Equipment, sizes and capacities are given; also testimonial letters from customers.

TIE PLATES.—The Hart Steel Co., Elyria, O., is issuing catalog No. 3, embracing widely known types of tie plates, from the old flat top Servis to the new McKee rolled steel, longitudinal-flanged, shoulder tie plate. The various types are illustrated and all their dimensions given, including the McKee four flange, rolled steel; center flange, rolled steel; corrugated top, four flange; corrugated top, parallel flange; corrugated top, flat bottom; the Servis, four flange; flat top, single flange, etc. The catalog presents Robert W. Hunt & Co.'s report on the effect of the reinforcement and also results of a test.

PUMPS AND PUMPING ENGINES.—The M. T. Davidson Co., Brooklyn, N. Y. Catalog. 96 pages. 6 x 9 inches. Gives illustrated descriptions of steam pumps, pumping engines, power pumps, condensers, evaporating and distilling apparatus, ash ejectors, etc., sizes and details of the various types, and other useful information as to the connection and running of pumps, etc. Some of the types illustrated include the Davidson heavy pressure pump, piston pattern; heavy pressure pump, outside-packed plunger pattern; extra heavy hydraulic pressure pump; light service pump; vertical single pump; vertical duplex pump; automatic feed pump and receiver; ammonia pump, various types of pumping engines, elevator pumps, surface condensers, etc. Hydrant and hose stream data, a metric conversion table and other tables showing areas of circles, pressures of water and equivalents are also presented.

MOTOR DRIVE FOR MACHINE TOOLS.—The General Electric Co., Schenectady, in Bulletin 4548 illustrates typical examples of direct and alternating current motors installed on lathes, drills, grinders, punchers, shears, boring mills and similar tools. Among the advantages pointed out in the bulletin are general economy of power and increased production, ease of control and convenience of handling, better arrangement of tools, independence of environment and greater cleanliness and decreased cost of maintenance with increased safety to employes. A short description of typical General Electric motors, rheostats and controllers is followed by half-tone illustrations showing the motors installed on tools of various manufacturers, from portable drills to heavy punches, boring mills and engine lathes.

CRANES.—The Cleveland Crane & Car Co., Wickliffe, O., is distributing a large, handsome catalog printed on heavy gray paper in two colors, presenting all the different cranes designed and built by the above company within the past 12 years, illustrating the various types and detailing advances made in the construction of hoisting machinery. The cranes are specially designed and constructed for different purposes. A detailed description of the various parts of the cranes is given. The illustrations are mounted and include alternating current cranes, standard four motor cranes, lattice girder cranes, four motor traveling gantry cranes, hand power cranes, floor operated cranes, electric traveling hoists, etc., installed at different plants.

FLEXIBLE TRANSMISSION.—The Coates Clipper Mfg. Co., Worcester, Mass. Bulletin No. 21, illustrating and describing the Coates unit link flexible shaft and its various uses, hardenend steel, ball socket joint flexible transmission, housed gear breast drills, bevel gear drill presses, worm feed drill presses, flexible shaft buffing outfits, friction driven auto buffing outfits, drop forgers' engines designed for heavy work, flexible speed multiplying grinder, foundry equipments, portable motor trucks, patent screw drivers, radial drills, counter shafts, etc.

MELTING AND REFINING FURNACES.—The Hawley Down Draft Furnace Co., Chicago. 80 pages. 8¼ x 10½ inches. The furnaces described and illustrated in this catalog are used by melters and refiners of brass, copper, bronze, aluminum, gray iron, malleable iron, steel and other metals, the fuel used being crude oil, fuel oil or gas. The furnaces are built in sizes ranging from 100 to 20,000 pounds per heat, are lined with high grade firebrick, and are simple in construction, no crucibles being required. The catalog contains a number of tables showing effects of chemical elements on cast iron, a heat unit table, tables showing melting points of metals, temper colors of steel, various mixtures for castings, alloys, metals, etc., various sizes of blowers suitable for the furnaces, low and high pressure tables, general instructions as to locating the furnaces, starting, operation, care, oil feed, etc., and other important data.